ELECTRICAL REVIEW

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Domestic Cookers

Future Design and Demand

IN our last issue we mentioned a broadsheet produced by P.E.P. (Political and Economic Planning) surveying the whole field of domestic equipment and forecasting the requirements during the first ten years after the war. The publication shows signs of a great deal of research into a subject which enters largely into the general standard of living and it forms a useful guide to the relative merits and prospects of the three principal domestic servants—coal, electricity and gas.

Generally the document shows a tendency to be fair in assessing the claims of each but, as in all such studies, apparent costs and thermal efficiencies are mainly relied upon in the comparisons. We realise that it is very difficult to give a cash value to the imponderable advantages of electricity but these certainly exist. The great advance in the use of electrical equipment cannot be ascribed entirely to novelty or propaganda.

Housewives' Preference

It appears to be realised that there is something in electric cooking: recent decisions of local authorities regarding the equipment of temporary houses have shown this. We do not know what value is to be placed on the results of an inquiry by the National Union of Townswomen's Guilds quoted in the report but it is shown that 40 per cent. of the replies from Scotland expressed a preference for electric cooking against 18 per cent. for gas and Scottish housewives are surely not less thrifty than English. For England and Wales, it has to be admitted, the figures were 35·57 per cent. gas and 17·85 per cent. electric. Very few housewives seemed to want coal ranges.

It is implied that if manufacturers of electric cookers exploited more fully the many advantages of electricity they would greatly increase their market. Electricity, properly developed, says the report, could be used to produce a wide range of variations of penetration and temperature. "Even in a less highly developed state, electricity can be made to produce a wide variety of wave-lengths in the radiant heat portion of the spectrum, in addition to convective and conductive heat."

Desirable Features

As regards the "conventional" cooker it is suggested that in addition to the grill (which should be used for grilling only) there should be a simmering ring and two boiling plates (or at least one), preferably of the low-voltage open type. We imagine there would be great difficulty in accommodating so much in the tops of the general run of small cookers. The suggested oven capacity of about 2 cu. ft. indicates the size of cooker envisaged. Thermostatic control is considered essential and the drop-down type of oven door is thought to be preferred. We hold the opinion that where there is enough space the horizontal cooker with separate hot-plate unit is a good idea, but the report confirms our belief that there will be thousands of kitchens too cramped for this.

In view of what is said regarding the various types we think that the forecast of the demand for new electric cookers is

rather conservative. We certainly hope to see something better than a two to one ratio in favour of gas and that applies even more to the suggested replacement figures.

Television

THE Hankey Committee's recommendations that television should be resumed after the war with the same 405-line definition seems the only practicable one. Before the war Great Britain led the world with its Alexandra Park transmitting station, but it is not owing to complacency that this system is to be re-established, as there are still many lines of research to be followed up before substantial advantage can be taken of more recent experience. An idea as to the many problems to be solved may be gained from Col. Sir Stanley Angwin's presidential address to the I.E.E. in 1943. Account has also to be taken of competing claims, such as those of aeronautical wireless communication, on the range of available frequencies—a matter upon which early international agreement is essential. Suppression of electrical interference with reception should, as the Report urges, be enforceable.

Sunderland's Coal

As the birthplace of Sir Joseph Wilson Swan, the inventor of the electric incandescent lamp, and the centre of such diverse activities as shipbuilding, coal mining, glass works and steel making, in addition to a host of lighter industries, Sunderland's jubilee is of dual significance. Typical of the increase in efficiency of combustion during the undertaking's existence is the difference between the 11 lb. of coal needed to produce a kWh in early days with 1⅓ lb. now. On the other hand the price of coal was then less than 7s. per ton compared with 17s. immediately before the war and 36s. to-day. Causes outside the control of engineers have prevented consumers receiving the benefits of technical achievements in the form of even lower rates than those now charged in Sunderland and elsewhere.

Power and Space

FORTUNATELY for the users of electricity, improvement in the efficiency of heat to power conversion has been accompanied by increases in the rate of power produced to space and weight of plant and this has been responsible for considerable financial savings. Thus in 1900 Sir John Snell reported that the site chosen for the projected Hylton Road power station would be suitable for 15,000 HP. With the subsequent development of high-speed turbo-alternators and boilers of large outputs and higher steam conditions than were contemplated at that time, the site has proved good for about six times that amount. Even in the inexpensive days of 1903, the general average cost per kW installed stood at £72, Sunderland taking pride in being well below this figure at £51. The new 40,000-kW plant cost rather less than £20 per kW as an extension, but the general average nowadays is taken at round about £30.

Contractors' Showrooms

ALTHOUGH in this issue we publish an article, by Mr. H. R. M. Sadler, in which the "pros" of the establishment of joint showrooms by electrical contractors are overwhelmed by the "cons," the Plymouth contractors are evidently of another mind. It was stated at a recent E.C.A. meeting that they were forming a £3,000 company and that the capital would be heavily oversubscribed. The view was held at Plymouth that "such an effort was likely to prove particularly remunerative." No doubt all the points raised by Mr. Sadler have been thought of but it is apparently felt that the various disadvantages can be surmounted. It will be interesting to watch the outcome of this enterprise.

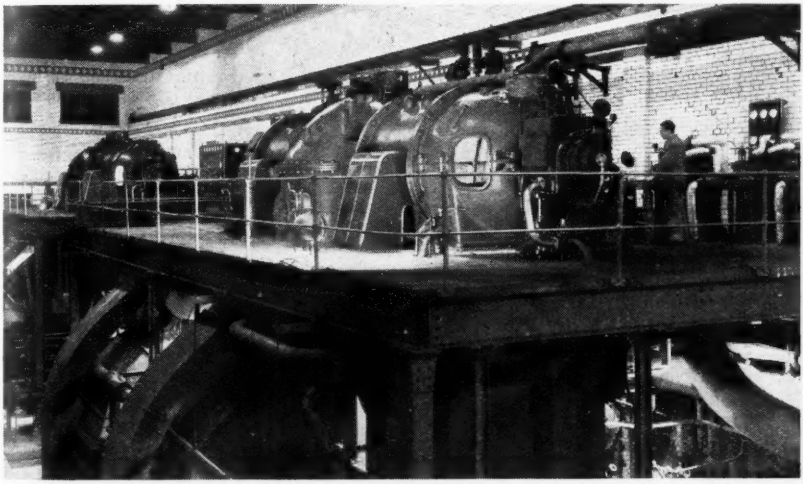
Matabeleland

TRANSMISSION of 100,000 kW at 80 per cent. load factor from the Victoria Falls to Bulawayo, 280 miles away, is the main feature of an electrification scheme projected by Mr. A. R. Sibson in the *I.E.E. Journal* (Pt. 2) for February. To transport coal by rail from Wankie (70 miles nearer) for generating electricity at Bulawayo would, he estimates, increase the overall cost per kWh by more than one-fifth and Wankie is too unhealthy for an industrial centre. Bulawayo is connected by rail with large ironstone fields and the steel industry would provide most of the load. AC transmission is proposed, but possibly before 1958, when the author expects the electrical demand to warrant the establishment of the Falls scheme, direct current transmission will be a practicable alternative.

Sunderland's Jubilee

Extensions at Hylton Road Generating Station Inaugurated

APPROPRIATELY, the completion of fifty years of electrical development in Sunderland was signalised on March 6th by the official inauguration of a 40,000-kW extension at Hylton Road power station. The new plant brings the installed capacity to 66,000-kW—over 400 times that of the first station at Dunning Street when it was started up on the same date in 1895 with Mr. C. S. Vesey Brown in charge of the undertaking. His successors have been the late Sir John Snell, afterwards chairman of the Electricity Commissioners, Mr. A. S. Blackman, one of the original "point fives" and, for the past ten years, Mr. W. A. Royle. At March 31st, 1944, the capital expenditure on the undertaking stood at £2,105,033 and during the previous twelve months 94 million kWh was sold to upwards of 27,000 consumers. Progress in domestic supplies has been encouraged by the adoption, in 1935, as a secondary rate for the two-part tariff of "three units for a penny."



The two new turbo-alternators of 20,000 kW maximum continuous rating, 16,500 kW economical rating

The new generating sets consist of two Ljungstrom 20,000-kW 3,000-RPM turbo-alternators made by the Brush Electrical Engineering Co. The turbines take steam at 400 lb. per sq. in. and 800 deg. F and exhaust to Richardsons, Westgarth condensers with surfaces of 18,000 sq. ft., which are designed to maintain a vacuum of 28 in. (Bar. 30 in.) at 16,000 kW loading when supplied with 15,000 gal. per min. of circulating water at 80 deg. F. The two half-duty Mather and Platt circulating-water pumps are driven by 210-HP 725-RPM motors and work in connection with a hyperbolic ferro-concrete Davenport cooling tower with a capacity of 1,650,000 gal. of water per hr. Two Drysdale Pervac vertical extraction pumps coupled to 42-HP 1445-RPM Brush motors can deliver 350 gal. per min. of condensate against a head of 170 ft. Feed make-up is provided by an evaporator giving a net output of 9,500 lb. of distilled water per hr. at 200 deg. F. The two 10,000-kW alternators of each set are ventilated by two 90-HP Aerex fans for cooling 25,000 cu. ft. of air per min. from 141·5 to 99 deg. F. with 200 gal. per min. of cooling water at 85 deg. Switchgear controlling the alternators, feeders and works auxiliaries is of Reyrolle make.

Steam-raising plant comprises three Clarke, Chapman stoker-fired water-tube boilers with Melesco superheaters. Their continuous ratings are 121,000 lb. per hr. with steam conditions of 450 lb. per sq. in. and 850 deg. F. The combustion-chamber walls are of the Bailey water-cooled type. Green's economisers increase the feed-water temperature from 300 deg. F. (to which it is raised by bleeding the turbine at three points)

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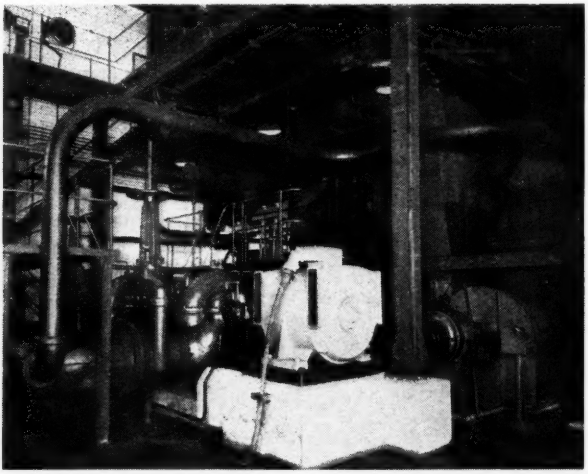
to 400 deg. Howden's rotary regenerative heaters raise the temperature of air to the furnace to 290 deg.

Two Davidson induced-draught and forced-draught fans have been installed for each boiler. The former, which are fitted with grit collectors, have duties of 38,200 cu. ft. of air per min. at 270 deg. and are driven by 93-HP 725-RPM motors and the latter furnish 24,300 cu. ft. with 39-HP 870-RPM motors. Infinitely variable speed control is given by Vulcan-Sinclair hydraulic couplings operated from the main control panel, located in front of each boiler. Flue gases are discharged to a brick chimney having a minimum internal diameter of 18 ft. and a height of 254 ft.



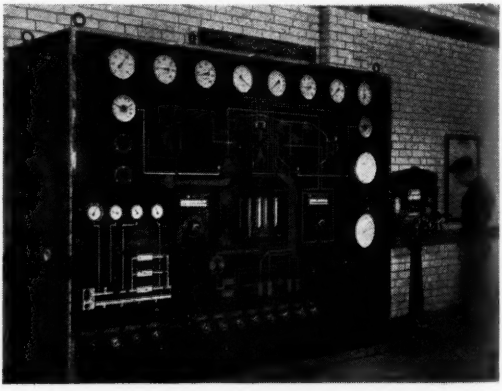
Condensing plant of one of the new generating units

Between the boiler house and the turbine room are three electrically-driven and two steam-driven turbine feed Mather and Platt pumps, running at 3,000 RPM, each capable of dealing with 25,000 gal. of water an hour against a pressure of 575 lb. per sq. in. Three Paterson lime-soda cold-process acceleration-type water softeners have been installed for treating up to 54,000 gal. per hour of water provided by three artesian wells and used for both boiler-feed and condensing water make up.

Rail-borne coal, which is handled by International Combustion plant, is discharged into 200-ton hoppers and fed into gravity bucket conveyors which take it to overhead bunkers. Ash is handled by a Dempster drag-link conveyor (4 tons per hr.), which will serve the whole station, and is discharged to an overhead bunker; it is said to be of considerable value for land reclamation purposes as well as for building work.

These extensions were carried out at a total cost of approximately £750,000 under the advice and supervision of the borough electrical engineer and general manager, Mr. W. A. Royle. Main contractors for the boilerhouse and turbine-room buildings for the extensions were Clarke, Chapman & Co., Ltd.

Other contractors, apart from those mentioned in the body of the article, were : The Superheater Co., Ltd., superheaters; Electroflo Meters Co., Ltd., automatic fan control; Hydraulic Coupling & Engineering Co., Ltd., variable-speed drive for fans; Hopkinsons, Ltd., steam-valves and boiler fittings; Aiton & Co., Ltd., steam piping and evaporators; Copes Regulators, Ltd., feed-water regulators; Laurence, Scott & Electromotors, Ltd., motors; the Watford Electric & Manufacturing Co., Ltd., motor controls; the



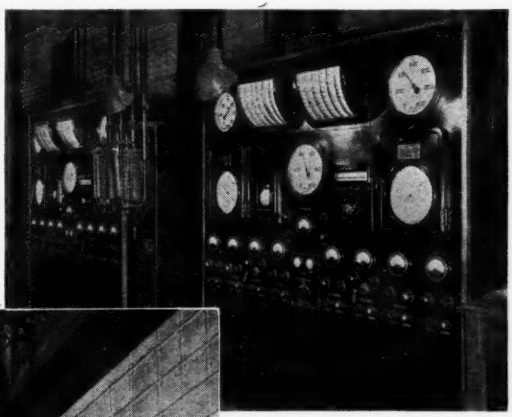
One of the turbine control panels

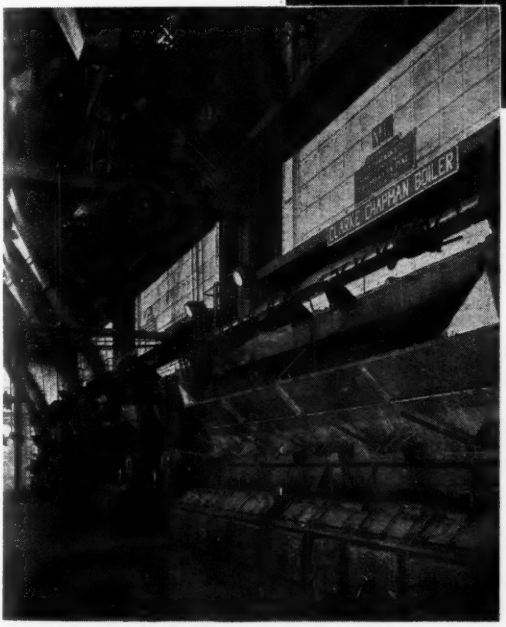
Sturtevant Engineering Co., Ltd. ventilating fans (incorporating Brush motors); J. Blakeborough & Sons, Ltd. and Alley & McLellan, Ltd., water valves.

Inauguration Ceremony

The formal inauguration of the extensions was performed by Major Gwilym Lloyd George (Minister of Fuel and Power), who unveiled a bronze plaque at the power station commemorating the occasion. Speaking later at a banquet held in connection with the jubilee, the Minister said he always tried to make personal contact with the industries for which he was responsible. He congratulated Mr. Royle and his staff in maintaining supply under war difficulties and also on the excellent progress made in recent years.

Major Lloyd George said he would like to take that opportunity of paying a tribute to the electricity supply industry for the great part which it had played in the national effort.





Boiler house showing fronts of boilers and oscillating coal chutes; above, boiler control panel

Those concerned had fulfilled their duties even through the worst periods of the war. In spite of the age of some of the plant and the quality of the coal sometimes supplied the electricity supply had only failed the country five times and for very short periods. He also referred to the survey of the Durham coalfields that had recently been completed.

Close association with Sunderland electricity undertaking through his father, the late Sir Alexander Kennedy, who acted as consultant for the original Dunning Street station, was claimed by Sir John Kennedy (deputy-chairman, Electricity Commission), who regretted that some Ministers were still not fully aware of the importance of electricity in industry. He attributed the enormous electrical development during the past fifty years partly to public insistence on having electricity supplies and partly to the enterprise of electricity committees. Pointing out that electricity brought the greatest benefit to the poorer classes, he expressed the view that success should be measured in terms of service to the consumer and that competition was a keen stimulant to success. Though coal had doubled in price during the war Sunderland had been able to sell 50 per cent. more electricity at an average price showing less than 10 per cent. increase.

Responding on behalf of the guests, Mr. Harold Hobson said that as chairman of the Central Electricity Board he felt as one of the family. He was a little

perturbed at the tendency to mix power station extensions with æsthetics. He was all in favour of beauty but we were an industrial nation and industry needed power—and power nowadays meant electricity. That power had to be provided.

Others present on the occasion included Sir Johnstone Wright (general manager, C.E.B.), Mr. C. S. Vesey Brown (Sunderland's first borough electrical engineer), Mr. G. E. Moore (president, E.P.E.A.), Messrs. Stephen Furness and Samuel Storey (M.P.'s for Sunderland) and Alderman E. W. Ditchburn who was chairman of the Electricity Committee while the present extensions were being carried out.

Control room for remote operation of switchgear in the two separate switch-houses

Remote Control of Substations

The Common-Diagram System

OPERATIONAL control of remote supply networks by means of central supervisory equipment is dealt with in a paper prepared by MESSRS. W. KIDD (Manchester Corporation) and E. M. S. MCWHIRTER (Standard Telephones & Cables, Ltd.) for presentation to the Transmission Section of the Institution of Electrical Engineers this week.

The paper states the reasons for, and development of, the common-diagram system, which enables an almost unlimited number of substations to be completely controlled from one panel with a single diagram and is sufficiently flexible to cater for the growth of the network. It describes a wall-type system diagram that automatically indicates which substations have changed conditions and, therefore, the area involved in any disturbance. The diagram is extensible to accommodate additional feeders and substations with the minimum of operating disturbance.

Manchester Installation

Particulars of the circuits and apparatus, with graphical comparisons of floor area, pilot and cost economies are included; also information about an installation at Manchester dealing initially with 78 substations to which others are being added. It includes a wall-type system diagram in combination with a control desk of moderate size, which is capable of having any additional number of substations connected to it without increasing the size of the desk and at less cost than individual panels. Pilot-line pairs are available in the telephone network between most of the substations concerned.

Supervisory Control Signalling

Methods of employing the common diagram system depend upon a technique well known to automatic-telephone switching engineers, for, given the method of supervisory signalling, the rest is a matter of calling a particular substation, or being called by it, and connecting its line wires to the common-diagram equipment. It is obviously convenient to make the impulsing voltages used for the supervisory and substation calling signals the same, but, in general, almost any method of supervisory-control signalling could be adopted which employs impulse trains for selection and does not depend upon maintaining a continuously rotating synchronism between substation and control.

It is claimed that the development of normal automatic telephone switching practice for remote supervisory control has widened the applications of the latter, resulting in economy of cost of equipment and buildings as well as of effort of the control staff. The system described is believed to form the basis on which fresh requirements can be satisfied without adversely affecting present facilities.

Television Service

The Sankey Committee's Recommendations

REINSTATEMENT, coupled with continuous development, of the B.B.C. television service as soon as possible after the war is urged by a Committee appointed in 1943 under the chairmanship of Lord Sankey and consisting of two representatives each of the B.B.C. and G.P.O. with one each of the Department of Scientific and Industrial Research, Air Defence Research and Development Establishment of the Ministry of Supply and the Treasury.

Resumption of Pre-War Service

It is recommended that the 1939 service should be restarted in London on the basis of 405-line definition as soon as possible after the cessation of hostilities in Europe. The service could, it is believed, be in operation within nine to twelve months of the release of the requisite staff. The Alexandra Palace should be released from its present war uses as early as possible to permit reconditioning of the B.B.C. transmitter there, which should be completed in from six to nine months with an additional short period for testing. A limited number of people would need to be returned from war work as early as possible to the B.B.C. and its contractors, to the G.P.O. and to manufacturers for essential preparatory activities. The industry estimates that it may be possible to produce television receivers within nine months of the release of staff and permits for materials.

The Sankey Committee's conclusion is that extension of the service to possibly six of the most populous centres in the provinces so soon as may be practicable after reinstatement of the service in London should be on the pre-war system, but that the actual scope of extension be kept under review by the Advisory Committee (which was appointed in 1935) in the light of the general conditions prevailing at each stage and possible fresh developments.

Possible Improvements

Vigorous research, co-ordinated under Government auspices, should begin immediately staff can be made available, aiming at producing a radically improved system of television. Evidence strongly supported the aim at an eventual approach to cinema standard with definition of the order of 1,000 lines. The introduction of colour and stereoscopic effects should be considered. It is agreed that definition must approach that of the cinema before large-screen television will be generally acceptable. The cinema industry fully recognises the important part that television is destined to play in future public entertainment, although it does not at present feel able to gauge the degree of public response to television in the cinema theatre.

It is, in the Committee's opinion, vital to the success of television that the G.P.O. should be granted the necessary powers to enforce suppression of electrical interference with reception.

The patents problem is thought to be essentially one for the television industry. Being satisfied that a patent pool would not be successful in practice unless it were arranged by the industry itself, the Sankey Committee recommends that the main manufacturing firms be encouraged in every possible way to pool their patents and that the Advisory Committee should, as opportunity offers, influence the owners of such patents to make them available for use as the national interest may demand.

The industry is very much alive to the export market aspect, in which there are obvious advantages apart from its direct financial return. But a flourishing home market in receivers is an essential prerequisite to export trade; the responsibility for developing the latter is the industry's. The Sankey Committee urges, however, that the ideal of international standardisation should be kept contantly in mind. As the first step towards its attainment the Committee suggests that the earliest possible opportunity should be utilised to reach international agreement on the bands of frequencies to be allocated to television. Meanwhile the immediate post-war British standards should not be changed to bring them into conformity with the present American system which utilises 525-line definition.

Financial Aspect

Financing the television service must depend on the method of financing the B.B.C. sound broadcasting service after the war. The aim should be to render the television service self-supporting as soon as may be possible, though clearly it cannot be in the early stages of development.

It is recommended that a special television licence should be introduced for domestic viewers at a fee of £1 per year, additional to the present B.B.C. fee of 10s. annually, and that one for cinema television should also be introduced at a fee to be considered at a later date.

The report concludes with a list of witnesses and organisations represented as well as descriptions of the Alexandra Palace transmitting station and the Marconi-E.M.I. system of operation.

Views on the News

Reflections on Current Topics

SINCE individual loads up to 50,000 kW have been supplied with the aid of the grid to munition works, despite the handicaps of war, no difficulties need be feared in meeting electrical demands of any magnitude in peace, as Mr. E. R. Wilkinson stated at last Saturday's A.S.E.E. luncheon. Proof of the confidence felt by the Ministry of Aircraft Production in the reliability of electricity from public mains was given by Mr. Lennox-Boyd, who spoke of the ultimate construction of a 100,000-HP wind tunnel for the new aeronautical research station ; this should produce something more than a hurricane. Such large-scale applications of electricity are important but everyone will agree with Mr. Wilkinson, I think, that it is of at least equal importance that industrialists should electrify wherever this will add to production efficiency.

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Mr. Wilkinson did not seem to think so much as Sir Cyril Hurcomb of the Severn Barrage. It is certainly true that however desirable the Barrage may be as a national asset and however debatable its economic aspect, in the widespread nature of its effects and in coal-saving it is far behind railway electrification. If coal is likely to rise to 50s. per ton into power station bunkers—a possibility to be viewed with the " gravest concern "—this adds to the cogency of Mr. Wilkinson's suggestion that a panel of experts should be appointed by the Government to review the Weir Report of 1931 in the light of prices and conditions to be expected in the future.

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Members of the Eastbourne Electricity Department's staff will be sorry this summer to leave St. Winifred's School to which they have been evacuated since their own offices at Electric House were damaged by bombing in 1940. The latter have now been repaired and there is no longer any excuse for remaining in the pleasant surroundings of the school, with its beautiful gardens. Inside the building the visitor is liable to get something of a shock at the furnishings. When the school moved out, in somewhat of a hurry, most of the equipment was left behind and superimposed on this are all the impedimenta of an electricity supply undertaking. Established in the head mistress's room, Mr. N. Boydell, the borough electrical engineer and manager, has his books of reference side by side with religious works. The chemistry laboratories make excellent meter inspectors' rooms, and the general office staff must sometimes feel the urge to climb up the ropes or do hand-springs in the gymnasium which accommodates it. The music practice rooms made nice bedrooms for the fire-watchers and A.R.P. personnel, whilst the mains engineers, housed in the library, must sometimes be tempted to relax with a type of literature somewhat unusual to them !

* * *

Spending as I do a fair amount of time in the offices and waiting rooms of electricity supply engineers I am often surprised to observe what a bad example so many of them still set in the matter of electrical installations. It is, I suppose, a matter of familiarity breeding contempt, but surely those ingenious but slipshod (even dangerous) excrescences from power and lighting points, lashed up casually with insulating tape, must undo a lot of the excellent educational work that is being done by undertakings. Normally consumers do not of course invade supply authorities' domains farther than the showrooms, which are generally (but not always) beyond reproach, but it is just as well for engineers to be on the safe side and practise what they preach.

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Deploring the absence of natural association between the terms employed to denote light output and illumination of an object, Dr. J. W. T. Walsh, as reported in our issue of March 9th, recommended the use of lumens and lumens per sq. ft. " Foot-and-candle disease " may be held partly responsible for the passing of a resolution by a parish council in Yorkshire recently to introduce " moonlight " street lighting with, it was stated in the local Press, " 25-Watt lamps of 0·02 candle power." The feat of the fire-fly in producing eight times as much light as that given by a gasfilled lamp for the same expenditure of energy is quite impressive enough without crediting nature with more than 15,000 times the engineering efficiency of the artificial method.

* * *

I have been set wondering by a statement in a report of a meeting of the Tees-side Section of the E.P.E.A.—" The meeting closed after Mr. Lockwood had made a few historic remarks." The remarks themselves are not revealed. Unless some other recorder was there how will these remarks be historic ? Will they be handed down by word of mouth to succeeding generations of Tees-side power engineers ?—**REFLECTOR.**

Revision of Grid Tariff

Suggestions from the Administrative Angle

By W. Smith

CAREFUL consideration will need to be given to the form of tariff when the Central Electricty Board embarks upon the revision of its charges for the next grid tariff period. The grid tariff has been unpopular with electricity supply authorities for various reasons, usually depending upon how it financially affects a particular undertaking, and the main criticisms are set out below:—

1. The service charge in respect of supply to an undertaking at more than one point favours certain undertakings in close proximity to the Board's transmission lines.

2. (*a*) The basic demand, when including the demand in respect of a bulk supply to another authorised undertaker, is not reduced by that demand when the bulk supply agreement is terminated and supply from that source discontinued.

(*b*) The method of determining the basic demand penalises undertakings vigorously developed for many years before that in which the basic demand was determined, as undertakings not so progressive and reaching that stage of development later would secure additional load at the lower charges per kilowatt.

3. The maximum demand of an undertaking has been appreciably increased for a short period due to a brief cold spell, resulting in an increased charge to the undertaking which is claimed to be out of all proportion to the service rendered.

It is my intention to offer a possible solution to the problems which have given rise to these criticisms, and also to deal with other points which have created administrative difficulties for authorised undertakers receiving supplies of electricity on grid tariff terms. Taking the items comprising the grid tariff in the order in which they are published, the following suggestions are submitted for improvement of the existing arrangements.

Service Charge

The service charge in respect of each additional point of supply on the route of existing main transmission lines might well be eliminated in suitable cases, *e.g.*, in large rural areas where the cost of providing a supply would be otherwise prohibitive ; subject, of course, to the undertaker not claiming protection under Section 13 of the Electricity (Supply) Act, 1926, in respect of such supply, which would then be given on grid tariff terms. The Board would benefit by any diversity in the maximum demands at the several points of supply.

The advantage of close proximity to a grid transmission line at a point where an undertaker requires a supply for local distribution which could not otherwise be made available at reasonable cost is a fortuitous circumstance which, despite criticism (1) referred to earlier, should be utilised wherever it is economic and practicable to do so.

Additional points of supply are most likely to be required in rural areas, and undertakers responsible for distribution in such areas are, in my opinion, entitled to every facility that can be afforded to them in developing the use of electricity to the fullest possible extent.

Fixed Kilowatt Charge

It is observed from the leading article in the *Electrical Review* of November 10th, 1944, that the I.M.E.A. suggests "a sliding scale of kilowatt charge related to demand." This seems to introduce an unnecessary complication. A sliding scale can only result in criticism of its basis and lead to acrimonious discussion of its favouring of large or small undertakings as the case may be. The present tariff, with its "basic demand," set out to place all undertakings on an equitable basis and failed to do so, as the criticisms previously noted clearly illustrate. It was the first step on a sliding scale !

My suggestions for amending the fixed kilowatt charge are as follows:—

(*a*) The kW of maximum demand should be charged at a single standard rate.

(*b*) The maximum demand chargeable in any year should be that recorded in January, February, November and December of the *previous year*,

(*c*) The present adjustment for power factor should continue to operate, but should be the average power factor during the half-hour in which the maximum demand occurred in the *previous year*, as suggested in paragraph (*b*).

(*d*) The rates adjustment should be eliminated from the tariff as a trivial and unnecessary complication. An examination of the adjustments made under this provision during the period of operation of the grid tariff in one area reveals that the variation has never been more than a few pence per kW. It is also a factor which cannot be determined until some time after the close of the year in respect of which it is charged, an adequate reason in itself for the elimination of this adjustment.

Running Charge

The basic price of fuel is now so far below the actual cost that it will probably be raised and a corresponding adjustment made in the running charge per kWh.

There would appear to be no alternative to provision for a fuel cost variation in the running charge, but the present arrangement is very unsatisfactory from an administrative standpoint. The Central Board's charge for increased coal cost is passed on by undertakings supplied at grid tariff rates to their large power consumers. There is inevitable delay in determining the precise fuel cost in the year of account and it is charged by the Board in the first place on an estimated basis. When the final cost is available, which may be anything up to two years after the conclusion of the year to which it relates, it is customary for some undertakings to adjust their consumers' accounts which are subject to fuel cost variation in like manner. I cannot imagine what the consumers' reaction must be to such procedure, but it does not reflect very creditably upon the undertaking, and some method of overcoming this difficulty must be found.

I would suggest that (i) the fuel cost variation should be 0·01d. for each complete shilling rise or fall above or below the basic price per ton. Alternatively (ii) the estimated cost calculated at the commencement of the year of account should stand, any increase or reduction in cost being treated in the account for a subsequent year.

Under (i) there is reasonable prospect of the actual cost of fuel for the purpose of the account being the same as the estimate, and under (ii) there is no doubt whatever about the achievement of the objective, for any difference will only affect the cost of fuel in a subsequent year.

Some critics of the grid tariff, particularly those who have complained as a result of an unexpected increase in maximum demand, have not always presented their case in its true perspective. They have forgotten, all too soon, the increase in generating plant capacity which in past years they would have had to provide, and at far greater cost in the initial stages, before the increased demand could be met.

Among all the criticisms I have never seen a word of appreciation of the Board's genuine desire to assist " undertakers who may wish to accept a new load of exceptional size during the later months of the year." The quotation, taken from the Board's Memorandum on the Grid Tariff, goes on to say that where a new load on offer during the last six months of any year would result in a substantial increase in the m.d. of an undertaking beyond that contemplated in the notice provided for by Condition 4 of the General Conditions for the Supply of Electricity at the Tariff, the Board will reduce the kW charge in respect of the demand arising from such new connection in proportion to the period of the year after the commencement of the supply of such a load. Undertakers must in each case consult with the Board's district manager before accepting the new load.

The criticisms examined in this article make it clear that the grid tariff needs revising in the light of experience of its operation over the past twelve years, and it is hoped that these matters will be borne in mind when the revision of the tariff is under consideration.

Electricity in Matabeleland

Victoria Falls as a Power Source

A PAPER that seeks to assist in forming the basis for a long-term policy of electricity supply in the western half of Southern Rhodesia has been published in the *I.E.E. Journal* (Part II, Power Engineering, February 1945) by Mr. A. R. Sibson (City of Bulawayo Electricity Department) who submitted it as a thesis in lieu of the associate membership examination of the Institution.

After just over fifty years' existence as a section of the British Empire that portion of Africa is now " coming to life " industrially and the author's study shows that if the Colony is to progress on sound economic lines the provision of electricity in adequate quantity will require careful consideration. Possible avenues of electricity consumption are detailed, including railway traction and the natural growth of existing load centres. Estimated future load requirements together with generation and transmission statistics are tabulated while a map shows present production sites to have the following capacities: Bulawayo 28,500 kW (ultimate 120,000 kW), Umniati 8,750 kW (ultimate 80,000 kW), Gwelo 4,000 kW, Shabani 7,500 kW (ultimate 11,250 kW), West Nicholson 7,500 kW, Wankie 7,500 kW and Livingstone 2,000 kW (ultimate 4,000 kW).

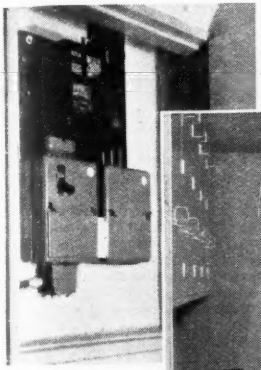
The author investigates three different methods of furnishing electricity in future, two of which would involve the transmission of large blocks of power over distances exceeding 200 miles. The peculiar problems inherent in long-distance transmission in Rhodesia are dealt with and the economics of overhead line operation at 250 kV are examined. The final conclusion reached is that hydro-electric power, up to a total of 100,000 kW, from the Victoria Falls should be seriously considered as part of a comprehensive scheme. But it is emphasised that much field investigation remains to be done, particularly in relation to the Zambesi River, although that is not likely to affect the general conclusion which it was the object of this paper to reach.

The only two available sources of power in Matabeleland are coal at Wankie and water power from the Zambesi River. It is an oddly unfortunate coincidence that both should be close together geographically, on the extreme western boundary, and thus far removed from the centres of power requirement. The problem of power supply thus becomes one of fuel transport *versus* electrical transmission in a country that is very subject to heavy lightning storms during five months of the year.

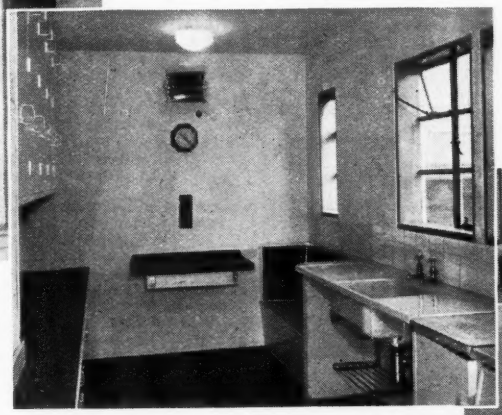
Future Birmingham Houses

Electrical Equipment of Experimental Buildings

IN our issue of September 1st last a description was given of two experimental houses being erected at Jephcott Road, Alum Rock, by the Birmingham Corporation. These houses have now been completed and have already aroused considerable interest and comment. It will be recalled that electricity is used for lighting in both houses, and electric plug points (15A) and gas points are provided in each house, together with electric wiring and gas piping to the positions fixed for the cooker, washboiler and hot water circulator. So that the relative merits of each service could be demonstrated, the Electric Supply Department and the Gas Department have each been responsible for the provision of the equipment in one of the houses.

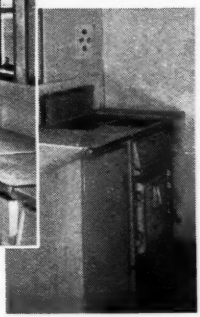


The kitchen of the "electric" house showing reflector type fire, clock and socket outlet



The illustration above shows the experimental type combined service unit installed in a special cupboard for electric and gas services

The electric cooker and control unit with special shelf for kettle can be seen in the picture below



Further particulars can now be given of the actual electrical equipment installed in the "electric" house. The kitchen has been designed in the closest collaboration with a panel representing housewives on existing Corporation estates. It measures 14 ft. by 7 ft. 6 in. and is fitted with a folding table and communicates with the living room through a service hatch. Two lights (separately switched) adequately illuminate the sink, cooker and table without causing shadows. A novel form of fitting which lights simultaneously the larder, store, drying cabinet and entrance to the kitchen, consists of an ordinary lampholder mounted in a wooden box with glass panels in the dividing wall between the store and the larder. Over the folding table is a 1-kW reflector type fire, an electric clock and a switched socket outlet for ironing, etc. The cooker is of the type normally available for hire and the standard control unit mounted at the side embodying a 5-A socket outlet for the kettle, together with the provision of a special shelf, prevents the kettle flexible trailing across the cooker hotplates.

In the living room a special type of grate, burning smokeless solid fuel, heats the bedroom through hot-air ducts and is fitted with a back-boiler, hot water from which circulates through a calorifier coil in a lagged copper storage cylinder in the airing cupboard. A 3-kW thermostatically-controlled circulator is fitted into the cylinder for boosting purposes or for use when the living room fire is not alight.

In the wash-house, a separate building, is installed the Department's standard 3-kW washboiler. A washing machine could, of course, be substituted, if desired. A special service cupboard at the foot of the stairs immediately beside the front door has two compartments—one for housing the electric service meter, main switch and consumer's fuses and the other for the gas service and meter. Here the first of the Department's experimental type combined service units has been installed.

The wiring and equipping of these houses has given the Department valuable experience in assessing the difficulties which will inevitably arise in actual practice in post-war building. The Public Works Department is now considering a method of construction somewhat different from that adopted in the above houses. The Electric Supply Department is investigating the possibility in these cases of the provision of detachable skirting boards, etc., giving definite channels and ways to accommodate the wiring, which would be placed in position as a complete job and thus economise in labour and supplying future extensions.

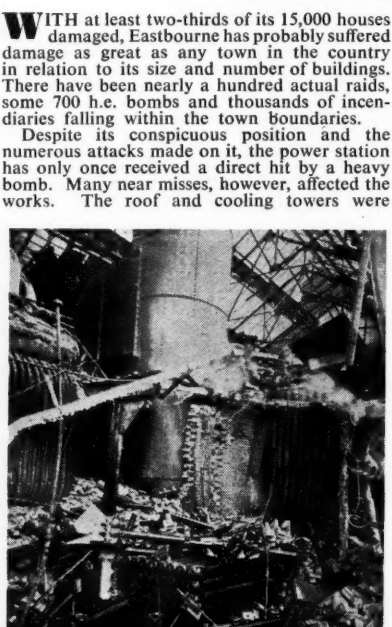
We are indebted to Mr. F. W. Lawton, chief engineer and manager, City of Birmingham Electric Supply Department, for this additional information, and we should also like to thank Mr. R. H. Rawll, sales and development engineer, for his assistance in the preparation of this article.

Experiences at Eastbourne

A Constant Target for the Luftwaffe

WITH at least two-thirds of its 15,000 houses damaged, Eastbourne has probably suffered damage as great as any town in the country in relation to its size and number of buildings. There have been nearly a hundred actual raids, some 700 h.e. bombs and thousands of incendiaries falling within the town boundaries.

Despite its conspicuous position and the numerous attacks made on it, the power station has only once received a direct hit by a heavy bomb. Many near misses, however, affected the works. The roof and cooling towers were



The wrecked boiler house at Eastbourne

frequently damaged, while on many occasions the plant was running under tarpaulins. The direct hit, which was made by a low-flying plane during daylight in August, 1942, destroyed a boiler and other plant and caused extensive structural damage. Bouncing between the cooling towers and the main control room, the bomb passed through a cooling tower, over the coal dump and through the pump-house and boiler-house walls, finally exploding behind No. 4 boiler, which was damaged beyond repair. The economiser behind was blown to pieces and the whole of the pipe-work was wrecked. The economiser behind No. 3 boiler and the fans and chimney serving both boilers had to be completely rebuilt. Fortunately No. 4 boiler was not working, but No. 3 was under steam and the fire had to be drawn quickly. Despite the widespread damage the supply from the station continued without interruption.

Considerable damage has also been done to other buildings of the undertaking and the offices, central stores and workshops have had to be moved twice. Incidents affecting the distribution system are numbered in hundreds but thanks to alternative switching arrangements and prompt repairs supplies have generally been restored in a very short time. Many substations have been damaged but only once has the gear had to be completely written off. Overhead lines have suffered considerably and once a crashing plane tore 11-kV lines off the poles for a distance of over a mile.

When the war broke out the undertaking had about 22,000 consumers taking nearly 40,000,000 kWh a year and having a maximum demand of over 18,000 kW. Due to evacuation, sales of electricity in 1942-43 had fallen to 21,000,000 kWh, while the maximum demand was less than 9,000 kW, the revenue falling from £241,045 to £162,530. The undertaking also had to face rising costs of coal and wages. With the gradual return of the inhabitants a considerable increase in output and revenue is anticipated in the current year, resulting it is hoped in the showing of a net profit for the first time for four years and the resumption of the progress, already very substantial, in domestic electrification.

Mr. N. Boydell, the borough electrical engineer and manager, whom we thank for his assistance in preparing this article, has nothing but praise for his staff for carrying on their duties not only in the face of direct danger from enemy bombing, machine gun and cannon fire, but also in the face of even greater potential danger from damaged electrical plant. By prompt and hard work, often continuing throughout the night, supplies have been restored at the earliest moment. When necessary danger has been faced without hesitation, as for example when a cable had to be laid around an unexploded bomb as a matter of emergency, or when an overhead line had to be repaired throughout the length of a minefield which had only just been reported as cleared.

PERSONAL and SOCIAL

News of Men and Women of the Industry

LAST week **Lord Brabazon,** president of the British Electrical Development Association, gave a private dinner at the Savoy Hotel. The guests included several Members of Parliament, Mr. C. Parker, chairman of the Association and a number of members of E.D.A.

Members of the American delegation of communications experts present in London were entertained at luncheon on March 7th by Sir **Edward Wilshaw** (chairman) and the directors of Cable & Wireless, Ltd.

Mr. J. N. Aldington has been awarded the Ph.D. degree (external) of London University for a thesis on "The High Current Density Mercury Vapour Arc." Dr. Aldington is very well known in the electrical industry and outside it for his work in the development of incandescent filament and fluorescent lamps during the past ten years or so. He is assistant works manager and head of the laboratories of Siemen's Electric Lamps & Supplies, Preston.

Dr. J. N. Aldington

The many interesting electrical, technical and trading questions dealt with by a "Brains Trust" at the monthly meeting of the Coventry Electric Club on March 6th covered changes in post-war house wiring, development of fluorescent tubular lighting for domestic premises, and the advisability of making compulsory the adequate lighting of all Class "A" roads. **Mr. F. Godden,** Coventry city electrical engineer, acted as question master, the members of the "Brains Trust" being: Messrs. F. L. Cator (B.T.H.), K. W. D. Roberts (Coventry Gauge & Tool Co.), A. Manighetti (Switchgear and Cowans), A. J. Heelis (Coventry Electricity Department), G. Marson (contractor) and S. A. Hunter (Electrical Construction Co.).

Mr. A. G. Owen, who for many years has been manager of the electrical accessories department of the Sun Electrical Co., Ltd., has in addition been appointed staff manager. **Mr. S. F. Collis,** manager of the company's Newcastle branch, will shortly take up new duties as general sales manager and will operate from the head office in London. **Mr. John Smith,** at present assistant manager at the Leeds branch, will succeed him as manager at Newcastle.

Mr. C. C. Oakham has been appointed traction engineer with the Associated Equipment Co., Ltd., in succession to **Mr. A. T. C. Priddle** who has left the company to take up another post. Mr. Oakham served with the former L.C.C. Tramways from 1923 until the formation of the London Passenger Transport Board in 1933, when he was appointed technical assistant (trolley-buses). He became senior assistant to the technical officer (trams and trolley-buses) in 1939, and occupied that post until he joined the chief engineer's staff in the A.E.C. organisation on March 1st.

We are very glad to hear that **Mrs. G. J. Berry,** who was seriously injured by enemy action in February last year when her husband, "Tim" Berry, chairman and managing director of Berry's Electric, Ltd., was killed, has just left hospital and is now well on the way to making a complete recovery. Her nine-year-old daughter, Jacqueline, who lost her leg, is getting on well with her artificial limb and is in excellent health, enjoying school life.

Mr. H. A. Nevill, M.I.E.E., has retired from the position of city electrical engineer and manager of the Peterborough Electricity Department and has been succeeded by **Mr. G. N. Green,** M.I.E.E., his deputy.

Last week presentations were made to Mr. Nevill from members and officers of the Corporation and from the staff, tributes being paid to the success of the undertaking during his twenty-five years' service. Previously he had been for sixteen years chief engineer of the Wakefield undertaking. He received his training with Belliss & Morcom, Ltd., and later was for two years charge engineer at Southampton. He was a pioneer in the use of pulverised fuel which was adopted at Peterborough in 1923. Recently trials have been made with the use of pulverised hard pitch as an independent fuel and to-day Peterborough is believed to be the only power station using this.

Mr. Green, who is thirty-eight, was born at St. Helens, Lancashire, and received his education and training at Cowley Grammar School, St. Helens Technical College, and with the Corporation Electricity Department. From 1926 to 1937 he was on the staff of British Insulated Cables, Ltd., first as assistant engineer and later as technical assistant. He was then appointed distribution engineer with the Croydon Corporation Electricity Department, leaving in June last year to become deputy city electrical engineer and manager at Peterborough.

Mr. T. W. Dann, M.E. (Liverpool), A.M.I.E.E., chief engineering assistant to Poplar Borough Council Electricity Department, has been appointed deputy borough electrical engineer to the Tunbridge Wells Corporation.

Mr. A. J. Roberts, A.M.I.E.E., assistant divisional electrical engineer (N. Area), London Passenger Transport Board, has retired after thirty-nine years with the London County Council Tramways and the Board. Previously he served for four years with the Bournemouth & Poole Electricity Supply Co., Ltd.

Manchester Corporation has expressed recognition of the services of **Mr. J. P. Hallam,** the engineer and manager of the water department, who is retiring. He was responsible for the electrification of the hydraulic pumping stations and the installation of electric generating plant at Haweswater works.

About 500 members of the Victoria Instrument Co., Ltd., and their friends, spent a thoroughly enjoyable evening at the annual cabaret and dance held at Wembley Town Hall

on February 27th. Carroll Gibbons' Blue Room Orchestra provided the music. Among the guests were representatives of a number of business competitors of the company.

Mr. S. I. Ellis (North-Eastern Electric Supply Co., Ltd.) has been appointed chairman of the E.D.A. Northern Counties Area for the sixth successive year. **Mr. T. E. Daniel,** borough electrical engineer of Darlington, is vice-chairman.

Cardiff Corporation Electricity Committee has appointed **Mr. H. Stanley,** of Hackney, as assistant combustion engineer at the Roath power station.

Mr. F. Garside, A.M.I.E.E., deputy electrical engineer with the Reigate Corporation has been appointed borough electrical engineer and manager to the Kendal Corporation, and will commence his new duties on April 3rd.

At Reigate **Mr. J. E. Nunn** is promoted from assistant mains engineer to mains engineer, while **Mr. J. G. N. Harvey,** junior engineer, becomes assistant mains engineer.

Mr. W. H. Nottage has retired after thirty-four years with Marconi's Wireless Telegraph Co., Ltd., and has been presented with commemorative gifts by his colleagues. He had served for twenty-five years in the company's patent department and for the last seventeen years had been joint chief of that department in charge of patents.

Burnley Corporation Salaries Committee have recommended an increase in the salary of the borough electrical engineer, **Mr. T. B. Nutter,** from £900 to £1,200, plus bonus.

Consequent upon the transfer of **Mr. F. Overstall** to Peterborough, the Paisley Corporation is advertising for a deputy electrical engineer and manager at a salary of £600 rising to £750, plus war bonus.

Mr. R. J. Hunt has joined the board of Ransomes, Sims & Jefferies, Ltd.

Mr. J. D. Easton, M.Inst.C.E., who is retiring from the position of superintendent and engineer of the harbour and docks of Leith and clerk to the commissioners on May 15th, has been associated with many important undertakings in this country and on the Continent. Before going to Leith in 1913, Mr. Easton was for many years on the staff of the late Mr. P. W. Meik, M.Inst.C.E., consulting civil engineer of London and Edinburgh, and was engaged on the design and construction of many public works, including hydro-electric schemes. The latest was the hydro-electric works for the British Aluminium Company at Kinlochleven, Argyllshire, where he was resident from 1905 to 1910.

Obituary

Mr. G. S. Masters.—The death occurred recently at the age of fifty-three of Mr. Geoffrey Strange Masters, who since 1926 had been works accountant of the English Electric Co.'s Stafford Works. Mr. Masters joined the accounts department of Dick, Kerr & Co., Ltd., Preston, in 1911, and when that company was taken over by the English Electric Co., Ltd., he continued in its service. In 1923 he was seconded by the company to the Sudan Electric Light & Power Co., with whom he remained for about two years.

Mr. George Keith, chairman and managing director of Keith Blackman, Ltd., died on March 5th, at the age of sixty-nine.

Mr. H. S. Cumiskey, branch manager of the Newcastle sales office of Callender's Cable & Construction Co., Ltd., since November, 1935, died suddenly on March 5th.

Will.—**Mr. W. M. Haddow,** M.I.E.E., Glasgow, has left estate of £11,400.

Another Lincoln Inquiry?

Alternative Cooling-Water Proposals

LINCOLN Corporation is asking the Electricity Commissioners to hold another public inquiry into the proposed extensions to St. Swithin's generating station. Last autumn the question of cooling towers was the basis of inquiry. Now an alternative scheme for using the River Witham water for cooling purposes is the bone of contention.

The Witham scheme, which the City Council approved, was brought forward by Mr. C. E. Farran, the Corporation's consulting engineer, as an alternative to Sir Robert Pattinson's proposal that water should be taken from the Trent by way of the Foss Dyke for cooling purposes.

The Town Clerk (Mr. J. H. Smith), in a statement to the Press, explained that the Corporation met the Electricity Commissioners and the Central Electricity Board at a conference in London on February 20th, but this conference was inconclusive and it was arranged that another should be held between the Corporation and the Central Electricity Board. This took place in London, on February 26th, and on March 5th he received a letter saying that the Board was not willing to accept any responsibility for Mr. Farran's scheme.

The matter was considered in committee by Lincoln City Council on March 6th, and the Town Clerk was instructed to request that the Electricity Commissioners hold a public inquiry into Mr. Farran's scheme.

The consulting engineer's proposal was that the water required for cooling purposes (4,000,000 gal. per hr., being the maximum anticipated demand) should be drawn from the River Witham by means of pumps serving the condensers, and that, after picking up heat from the condensers, the water would be ejected into the South Delph through overhead pipes. The total estimated cost of the scheme was £72,500, and Mr. Farran estimated that the annual running costs would be £1,900. Sir Robert Pattinson's scheme would cost £75,000 with an annual running charge of £5,500.

Indian Electricity Policy

GOVERNMENT policy in formulating electrical development plans without consulting the electricity supply industry was criticised by Mr. V. F. Noel Paton, president of the Association of Electrical Undertakings, Bombay Province, at the Association's annual meeting. He said that the Government of India as well as the Provincial Government seemed disposed to proceed with the discussions without taking into account the interests of those who had done so much to develop electricity in the country.

CORRESPONDENCE

Letters should bear the writers' names and addresses, not necessarily for publication. Responsibility cannot be accepted for correspondents' opinions.

Universal Domestic Tariff

WITH reference to the letter of Mr. Ferns in your issue of March 2nd, under his proposed tariff a consumer with *one type* of heavy load will pay £2 0s. 11d. a quarter for 480 kWh, whereas a consumer with *five types* of heavy load would pay £1 11s. 9d. for the same number of kWh. This is a saving of £1 16s. 8d. per year for the consumer with the heaviest installed load, and this preferential treatment is given for the sole reason that this consumer has installed about five times as much load as the other. Can Mr. Ferns point out the logic of this ?

As regards his reference to the old-fashioned custom of giving a block-rate tariff to manufacturers in which a bigger consumption qualifies for a reduction in the average cost, this is not the same thing as giving the lowest price, on the same tariff, for a given number of kWh to the consumer with the heaviest installed load.

In over thirty years' experience, during some of which I have been intensely interested in tariffs, I have never come across an industrial or a domestic tariff which gives the lowest price for a specified number of kWh to the consumer with the highest installed load.

B. CROWSLEY,
Welwyn Garden City. A.M.I.E.E.

Discouraging Invention

THE Income Tax Bill is made a vehicle for the Treasury's scheme to assist production and incidentally to promote invention. With this object, emphasised by the Chancellor of the Exchequer, anyone who buys a patent is to be allowed to deduct the purchase price from his income tax in seventeen yearly instalments—the full life of a new patent if the heavy annual renewal fees (which are responsible for the early death of many promising patents) are paid. But in Part V of the Bill it will be found that the vendor of the patent, who will in most cases be the inventor and patentee, is to be taxed upon the purchase price which, for the first time, is to be regarded as income and not as the proceeds of a sale of property, which it really is.

The vendor is given not seventeen but six years in which to pay by yearly instalments. With income tax at 10s. in the pound, this means that he has to hand over half the proceeds of the sale of his patent. As a concession he may pay in a lump sum in the first year, if he prefers to do so !

The Government lately recognised the need for reform in patent law and appointed an influential committee to go into the whole question. Yet here is a piece of legislation introduced into a finance Bill in such a manner that it almost escaped attention.

The Treasury draws over £200,000 a year from the Patent Office. It takes income tax on any profits resulting from the working of the invention. Now it proposes in addition to confiscate half of the price an inventor gets from the sale of his patent.

The revenue now derived from the Patent office is somewhat obscure as no annual report has been available since the war broke out. The work of the Patent Office is at least twelve months behindhand.

In comparison the position of copyright is favourable. The proceeds of the sale of a book are treated as capital, not income, an attempt some time ago to introduce a change having failed. It is to be hoped that this attempt will also fail and that Parliament will wake up to the necessity of giving genuine assistance to inventors, who are the pioneers of progress.

POOR INVENTOR.

Gas for Power Stations

IN the *Electrical Review* of March 2nd, Mr. A. M. J. Roper propounds his gas for power stations scheme which has been proposed for a number of years. Many engineers, including myself, have spoken on this subject at meetings but with very little support, although support is growing. Boilers employing firing by waste heat gas have been in use for many years but were not as efficient per BTU as coal-fired boilers because the furnaces were designed both for gas and for coal firing as standby. This has now changed with the increasing use of pulverised fuel and in time due to labour and other questions gas will be used for periods of light loads at night and pulverised fuel during the day.

This also would give an increased load factor to gas works, and solve many ash problems which power station engineers face to-day, but there is another question when we advocate that everybody should go over to electricity for cookery and heating. We are as good as gas in many ways but hot-plates are a long way from being efficient and the cost of installation and maintenance against gas is a major factor. Also what is the position of the mains supply due to "economical" policy before the war ? The majority of supply engineers are worried now about the growing demand for domestic electricity which will entail considerable extensions of supply cables.

Urmston, Manchester. C. E. WARNER.

Valve Anode Rectifiers

MERCURY rectifiers of both the arc and vapour types employed for furnishing the 10 to 22 kV which is applied to the anodes of the valves in the final stage of modern radio transmitters are the subject of a paper prepared by MR. T. M. ELLISON for the London Students' Section of the Institution of Electrical Engineers. These have largely displaced a bank of diodes (hard valves) or motor-generator sets because their efficiency is greater and they are able to withstand instantaneous overloads of about 400 per cent. without damage.

The principles of their operation is explained and some of the many ways of polyphase connection, while the relative advantages of grid-control and induction regulation are outlined. The pumpless steel-tank mercury arc rectifier is displacing the continuously evacuated type because it obviates several losses which are inherent in the latter and, in addition, simplifies maintenance.

Although the first cost of a mercury-arc rectifier is much greater than that of a bank of hot-cathode valves of the same output, the useful life of the former is much longer ; the difference between their costs is thus probably balanced out in course of time. The pumpless steel-tank mercury arc rectifier is more efficient than a hot-cathode valve rectifier. The range of outputs of the latter is between a few watts and about 350 kW at from 10 to 15 kV with six valves connected in six phase, whereas the output of the former is from 50 kW upward. A steel tank rectifier is preferable for more than 100 kW, below which it may be more economical and preferable to employ hot-cathode valves, or thyratrons if grid-control is necessary.

Road Lighting Dazzle

AT a special joint meeting of the Birmingham Centre of the Illuminating Engineering Society with the Institution of Automobile Engineers on February 27th, the attendance of 240 included the chief officers of several municipal undertakings. Two papers were presented, in one of which DR. J. H. NELSON (Joseph Lucas, Ltd.) dealt with motorcar headlamps, pointing out that it was essential to realise that the discomfort effects of dazzle were not always accompanied by inability to see, so in practice a compromise between revealing power and comfort was necessary. Moreover, the successful functioning of such a lighting system depended upon well thought out legislation to tell the motorist what he must do. The " non-dazzling lamp " did not exist and the compulsory use of a flat-topped beam at all times could not be carried into effect, even if it were considered desirable.

The use of polarised light was not yet practicable. In the special cases of the dual carriageway and the city, the dazzle problem might be automatically solved, though it would introduce further lighting problems with the necessity for more compromises.

In the second paper MR. J. M. WALDRAM (G.E.C.) explained that the street lighting designer had to contend with many restrictions which often made it impossible to avoid noticeable glare for reasons not under the lighting engineer's control. Given freedom to make a reasonably generous design for road surfaces of modern types, glare could be reduced to an innocuous degree and sometimes almost eliminated. Street lighting was at present economically in an intermediate stage. As more adequate installations become possible, the glare would doubtless be reduced.

Polythene

PART of the story of the discovery of polythene, which is one of the major British chemical achievements, has already been told. It commences with the initiation in 1930 of a fresh programme of fundamental research by Imperial Chemical Industries, Ltd., but it was not until the end of 1935 that means were devised of coping with the extreme pressure and temperature involved in the catalytic synthesis of this new substance, which necessitated novel designs of reaction equipment. Meanwhile study of the properties of this plastic material indicated that its electrical insulating characteristics were outstanding.

During 1938 close contact was made with the Telegraph Construction & Maintenance Co., Ltd., which had machinery available which could be adapted for using it. An experimental length of submarine cable was made at the end of 1938 and a mile length in 1939, much to the interest of the British Post Office authorities. It was quickly realised that polythene was also most promising for high frequency insulation, especially in television.

By the beginning of 1939 another wartime use of polythene was under development with the Admiralty, for the insulation of certain special under-water cables. The army was also interested in new types of communication cable embodying polythene.

Early in 1940 I.C.I. shipped polythene to the du Pont Company in the U.S.A. for processing and a cable was made by the Western Electric Co. and laid on a section of the Bell Telephone Company's trunk telephone line between Washington and Baltimore. In 1941 an American delegation visited the I.C.I. plants, but it was not until 1943 that polythene was made on a full productive scale in the U.S.A.

To-day British plant has 200 times the output capacity of 1939 and 2,000 times that of 1938.

Whitaker's Almanack

THE publication of the 1945 edition of " Whitaker's Almanack "—the 77th—was delayed by difficulties connected with the war. This postponement has, however, made it possible to include the New Year Honours List as a supplement to the index. In addition to the familiar sections, including the Diary of the War, there are a number of topical articles on such subjects as UNRRA, Britain's War Effort, Education, Stratosphere and Rocket Flight, etc.

The usual three editions are published. The complete edition, cloth bound, with 1,052 pages at 10s. net; the shorter edition, paper-bound, with 704 pages at 6s. net; and the library edition, containing a special section of up-to-date coloured maps, and bound in leather, at 21s. net. The publishers (J. Whitaker & Sons, Ltd., 13, Bedford Square, London, W.C.1) state that all these, particularly the last, are likely to be in short supply.

All-Electric Kitchens

Experiments at Liverpool and Paisley

AS an experiment in connection with Liverpool's war damage reinstatement scheme the Corporation Electric Supply Department has provided some of the tenants on the Norris Green estate with full electrical facilities. In the smaller type of kitchen (80 sq. ft.) the equipment is placed along two opposite walls. On the window side it comprises a stainless metal draining tray, a sink and a fitted washboiler with metal lid. A wooden drain board over the boiler can be laid over the sink for the purpose of scrubbing clothes.

The washboiler can be filled from two additional taps with either cold water, or hot water heated by an immersion element in the house cylinder. The waste water can be drained away into the sink outlet, and a swivel pipe under the boiler allows water to be drawn into a bucket. When war restrictions permit, this washboiler unit will be replaced by a washing machine and wringer to be supplied by the Universal Boilers & Engineering Co., Ltd.

Against the opposite wall, there is on the left a clothes drying cabinet fitted with a Belling heater and a Vent-Axia fan. Next to this cabinet is a double shelf cupboard over a roomy hot-cupboard fitted with a bottom heat element whilst below is an

The larger of the Liverpool experimental kitchens

"Xcel" oven at table height. Underneath the oven is a withdrawable shelf and another cupboard.

Situated adjacent to the oven unit is a further cupboard over which is an "Xcel" hob unit with a 7 in. "Backer" boiling plate and Sunvic "Simmerstat," also an 8-in. "Torribar" boiling plate and a boiler grill with large grill cupboard. Next is a working table space accommodating a kettle or other small appliances, and on the right is a 1½-cu. ft. Electrolux refrigerator with a cupboard on top and a vegetable cupboard below. The refrigerator unit is designed to permit a larger capacity model to be fitted when procurable. Completing the ensemble is a cabinet for brooms, vacuum cleaner, etc.

Arrangements in Larger Kitchen

For the larger kitchen (132 sq. ft.) a different arrangement has been necessary as it is intended to use the room for meals. The oven unit has been placed on the window side, with the hob unit, draining tray and sink, and a combined washing machine, wringer and boiler unit which can also be covered with a wooden drain board. For this unit a Hotpoint washing machine was fitted with an external circulator (3 kW.). The refrigerator, broom and drying cabinet units are placed on an end wall. For heating, convector heaters with non-luminous elements are provided and there are plug outlets for iron, radio, etc. The whole of the apparatus is controlled by a master switch in the larder, individual control of the cooking and washing units being by push button control.

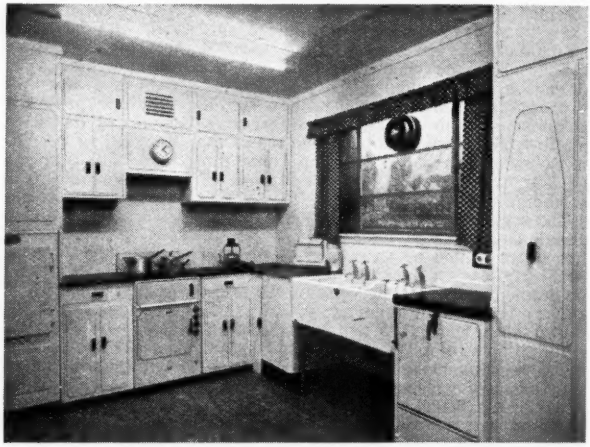
The general construction of the metalwork of the units was carried out by Elexcel, Ltd., to the design of the Liverpool Electric Supply Department and is made up of sheet steel with hardwood door linings. The units have been sprayed with blue synthetic paint and stove enamelled.

The city electrical engineer, Mr. J. Eccles, says that the provision of the electric kitchen adds something less than £100 to the cost of the house, and that the initial cost can be covered by a small weekly addition to the rent of a house, which many tenants will be only too willing to pay to obtain a home

fitted with labour- and time-saving and hygienic equipment of such handsome design.

Paisley Model

A somewhat different layout is suggested by a model kitchen constructed by the Paisley Electricity Department (engineer and manager: Mr. Daniel Ross). Next to a cupboard for storing the vacuum cleaner, etc., is a drying and airing cupboard with the ironing table constructed as an integral part. A porcelain tub and sink unit specially designed to obviate the use of a separate washboiler has an electric heater in the base. The complete washing is carried out between these two tubs, saving both space and labour. Either a hand-driven or power-driven wringer can be fitted, but with the latter motive power can also be provided for various other appliances such as a food mixer, vegetable preparing machine, mincer, coffee grinder, cream and egg whisker, etc.



Paisley Electricity Department's idea of a post-war kitchen

Although an up-to-date washing machine has been provided, further development of the arrangements described will render it superfluous. Plans have been prepared to incorporate an agitator in the deep tub for washing such clothes which are not boiled, while, with slight alterations, the whole arrangement could be used as a dish-washer. Under the draining-board there is a 20-gal. water-heater fitted with two immersion heaters and thermostats, giving 6–7 gals. of hot water instantly, and its full capacity in a short time.

The cooker can be provided either with the hob above or in line with the thermostatically-controlled oven. Various shades of finish will be available. The 3-cu. ft. refrigerator is of pre-war design and it is anticipated that a vegetable cupboard and refrigerator will be provided in one unit in post-war designs. Ample storage accommodation has been built in around these appliances and a kitchen cabinet is also provided opposite the window. The space between the hatch to the dining room is fitted with a " warming plate " to keep food warm.

Lighting is by means of 5-ft. " warm white " fluorescent tubes. Ventilators have been fitted in the window and above the cooker for the elimination of steam and cooking odours, and a loud speaker provides music. Straight-line design has been adopted in the layout, to facilitate unit construction which means that the number of units can be chosen and varied to suit any size of kitchen, and additions can be made when required. All the equipment described can be fitted into a kitchen 12 ft. by 10 ft. by 8 ft. 6 in. in height with ample storage cupboards.

Imperial College Centenary

PRESUMING that the war in Europe will by then be over, the Imperial College is planning to celebrate next autumn the centenary of the Royal College of Chemistry, from which, through two of its three constituent colleges, it can trace descent. The third week in October is contemplated, and it is hoped that the King, as Visitor of the College, may find it possible to be present. In connection with this centenary the College has recently launched an appeal for funds which by providing an endowment will enable it to develop a corporate life more comparable with that in older universities.

The Imperial College of Science and Technology, constituted by a Royal Charter dated July 8th, 1907, is a federation of three constituent Colleges—the Royal College of Science, the Royal School of Mines, and the City and Guilds College (formerly the Central Technical College of the City and Guilds of London Institute); and these in turn were related with earlier institutions, the first of which was the Royal College of Chemistry.

The Imperial College is a School of the University of London. Subjects at present available for study or as fields of research include metallurgy; mining; and engineering (chemical, civil, electrical, mechanical). In them all the instruction has by tradition a strong bias towards the practical and industrial.

Rural Extensions

Carlisle's Case for Assistance

REFERENCE has been made in these pages on a number of occasions to the impossibility of imposing upon the smaller electricity supply undertakings and their consumers the burden of extending the service to sparsely-populated surrounding country areas. The nature and extent of this burden is exemplified at Carlisle where the subject has recently been thoroughly gone into and Mr. A. C. Thirtle, the city electrical engineer and manager, has kindly provided us with some details resulting from this inquiry.

The Carlisle Corporation Electricity Department was approached by the Border Rural District Council with a request that the extensions of electricity supplies in the Rural District should receive early priority in the post-war programme. This rural area comprises 392 sq. miles. There are 37 parishes within the area and approximately 57 per cent. of the premises in 28 parishes are connected. The nine parishes which are at present without supplies are farthest from Carlisle and all are very sparsely populated. The following table shows the characteristics of the respective areas referred to :—

	Area sq. miles	Estimated		Density per sq. mile	
		Population	No. of Premises	Population	Premises
Carlisle authorised area ..	392	28,510	8,489	73	21·6
Area partially supplied (28 parishes) ..	257	26,342	7,897	102·2	30·6
Area with no supplies (9 parishes) ..	135	2,168	592	16·1	4·4

Although the parishes without supply comprise a third of the total area, only 7 per cent. of the total premises are situated within these parishes. It was at once realised that the capital expenditure necessary to make supplies available to the remote sparsely populated parishes would be very much higher than that justified by the anticipated revenue. In order, however, to assess the position accurately approximate costs of a scheme to afford supplies to the more accessible areas were calculated. Such a scheme to give supplies to 1,029 additional consumers (including some within the parishes already served) was found to cost approximately £220,000 and the anticipated revenue from the consumers connected would amount to £7,500 per annum after, say, five years development.

A revenue of at least £50,000 per annum would be required to avoid a heavy financial loss on such a scheme, so the Electricity Commissioners were asked if any Government financial assistance was likely to be available in the early post-war years for such a scheme. The Commissioners stated that so far as they could see there was no possibility of any such assistance being available and that the scheme was not likely to receive priority for material or labour required for its execution.

This information was passed on to the Border R.D.C. which has thereby been convinced that the anticipated loss on such a scheme would be too great a burden for the existing consumers to bear. The Border Council has, however, been requested by Mr. Thirtle to submit any inquiries for supplies from groups of neighbouring potential consumers within a reasonable distance of the present rural mains. Any such applications will then be considered on their merits as the undertaking is anxious to afford supplies to all premises where a reasonable return on the expenditure can be anticipated.

The North Cumberland area is very sparsely populated and, says Mr. Thirtle, is typical of many areas in which supplies in the future can only be carried out if development schemes are afforded considerable financial assistance either by the Government, as part of its policy to foster agriculture, or by the electricity supply industry by a contribution from the authorities which have densely populated urban areas but are free from all responsibilities for unremunerative rural development.

Electrical Training for Women

IN addition to training courses for members of the A.T.S., the Liverpool Corporation Electricity Supply Department, in response to a suggestion from the Liverpool Branch of the Electrical Association for Women, has just established a regular course of training in its showrooms for domestic science and science teachers who wish to qualify for the E.A.W. Certificate. The course, which is being conducted by Mr. Southwood, the showroom manager, commenced on March 3rd, and over fifty teachers have already enrolled from Liverpool, Wallasey, Birkenhead, Bootle, Southport and Ormskirk.

Modern Lift Practice

Are High Speeds Justifiable?

THE paper on modern lift practice by Mr. L. S. Atkinson, to which we referred last week (page 358) was read and discussed at a meeting of the Installations Section of the I.E.E. on March 8th.

In opening the discussion Mr. E. B. HUNTER (Phœnix Assurance Co.) said he wondered whether the increase of speed of lifts and the extra cost of the gearless machine were justified in the types of building in this country where the normal distance of travel was about 150 ft. What was the difference in prime cost for the higher speeds, apart from the question of maintenance, and to what extent did they affect the amount of over-run necessary at the base and top of the shaft? There was considerable reduction of maintenance cost when the machine room was at the top of the shaft.

Great Reduction in Accidents

MR. L. N. DUGUID (H.M. Senior Engineering Inspector of Factories) remarked that since 1937, when reasonable standards of construction and maintenance were imposed, there had been a steady and substantial decline in accidents. In 1937 the annual rate of accidents, which had been fairly steady for a number of years, was 430, but by 1943 the number had been reduced to 193. Fatal accidents numbered 25 in 1937 and 12 in 1943. Those figures included the whole of the war period, when the number of man-hours worked in factories had increased enormously. Much of the credit for that improvement was due to the lift makers. There was very little occasion for the breakage of suspension ropes nowadays, provided there was efficient inspection and maintenance. Accidents had been caused through lifts of an unsuitable type being used.

MR. R. S. PHILLIPS (Power Branch, G.P.O.) did not think the extra cost of high car speed was justified unless the use of the lift was confined to relatively long travels. He did not think the author was quite right in referring to the inherent inability of mercury arc rectifiers to return regenerated current to the line. The extension of variable voltage control was a retrograde step; development should be towards the use of DC motors and controllers.

MR. A. G. RAMSEY said that in his address as chairman of the Installations Section last year he advocated dimensional standardisation of lift wells, car sizes and landing openings and there was some movement in that direction. Nevertheless, he would like the author's opinion as to the extent to which he thought this was possible. As regarded gearless machines, standardisation in a few sizes of the motor-generator set, the motor and the control gear would tend to bring down the price.

MR. J. W. STANDRING, referring to safety gear, said that it was essential to carry out an exacting test when the lift was first installed and ensure that it really worked. The majority of buildings now were supplied with AC and where a lift speed of 300 ft. per minute was adequate, it seemed to him that tandem drive provided a very sound and simple engineering method that required very little maintenance.

MR. G. DAVIDSON said that according to the paper the difference in weight was less than 1 ton in having the machine room above and for such a small difference he doubted whether there would be any appreciable saving in the structural ironwork in the lift well. There was extra cost in sheaves and weights and rope if the machine room was at the bottom, but with the machine room at the top there was additional cost in cabling.

MR. V. R. TURNER was one of several speakers who expressed disappointment that nothing was said in the paper about ropes. It would be helpful to have opinions on the merits of different types available when the standard specification came up for reconsideration. The paper gave the impression that the standard two-speed AC motor was to be preferred, but his experience was that the tandem motor gave better results. It was slightly more expensive but the AC commutator motor was much dearer.

Author's Reply

The AUTHOR, replying to the discussion, said it was not so much a question of higher speed as the higher rate of acceleration and retardation which was secured with variable voltage control In buildings which required from ten to fourteen lifts, the use of higher car speeds made it possible to reduce the number of lifts and so free floor space. For a busy lift inspection once a week was not too frequent. Variable voltage control would supersede all AC motor drives for the more important lifts—for those duties which required two-speed motors. He still maintained that mercury arc rectifiers would not return regenerated current to the line. Standardisation was being considered seriously and in so far as new buildings were concerned everyone would agree that standardisation of car sizes had much to be said for it. He believed that collective control would go a long way in superseding push button control.

COMMERCE and INDUSTRY

Placing Plant Orders. Power Cut in Scotland.

Post-war Plant Contracts

IN the House of Commons on March 6th, Mr. Higgs asked the Minister of Fuel and Power on what authority the Electricity Commissioners had authorised undertakings to purchase electrical equipment for post-war requirements from specified areas such as Scotland, the North-East Coast and South Wales.

Mr. T. Smith, who replied, said he presumed Mr. Higgs was referring to a letter sent by the Electricity Commission to all authorised electricity undertakers on February 1st. The purpose of this letter, was, he thought, clear from the following extract: " . . . it would be of the greatest assistance in maintaining employment at the highest possible level on the conclusion of hostilities, or as and when war contracts are terminated, if undertakers could now proceed to place advance orders." The letter, which went on to point to areas from which it was believed that reasonable delivery was most likely, was sent with the approval of the Treasury, the Board of Trade, and his Ministry.

Mr. Ellis Smith said that post-war industrial efficiency would depend on the availability of large supplies of electric power at as cheap a rate as possible, and he asked what action was being taken to plan to bring that about.

Mr. T. Smith gave an assurance that all was being done to see that existing capacity was sufficiently worked and that extra capacity was provided as quickly as possible.

Iron and Steel Prices

The Control of Iron & Steel (No. 40) Order, 1945 (S.R. & O. 1945, No. 239) which came into force on March 12th, alters the maximum prices for certain iron and steel products, the principal changes being reductions in prices for forging ingots and alloy steel and increases for pig iron, tubes, certain classes of steel wire and wire rope, and certain iron castings. Maximum prices are also provided for the first time for hot finished and cold drawn tubes to Admiralty specifications and for cast iron brake drums.

Switzerland and the Allies

Last week amicable agreement was reached in the discussions which have been proceeding between the Swiss Government and representatives of the United Nations upon the subject of Switzerland's external policy. Among the matters which have been dealt with are the export of electricity from Switzerland to aid in the reconstruction of France. Until recently some Swiss power has been exported to Germany.

Mining Equipment Exhibition

About 350 persons attended an exhibition of mining equipment held under the auspices of the Association of Mining Electrical and Mechanical Engineers at the Tredomen Works, Ystrad Mynach, on March 3rd. A portion of the electrical department was allocated for this purpose by the Powell Duffryn Co., who also undertook the work of installation and erection of the equipment. Among those who took part in the exhibition, which covered the latest developments in coal-face equipment, were : George Ellison, Metropolitan-Vickers, B.I. Cables, B.T.H. Co., A. Reyrolle, Switchgear and Cowans, G.E.C., Mavor and Coulson, Anderson Boyes, Consolidated Pneumatic, Simplex, Automatic Telephone and Electric Co., Holophane Co., Callender's, Henley's, Glover's, Siemens, Johnson & Phillips, Hayes (Wigan), Pyrotenax, and the Safety in Mines Research Board. The exhibition was opened by Mr. B. L. Metcalf, chief electrical engineer of the Powell Duffryn Co. and branch president of the Association. Mr. D. A. Hann, director of production for the company, Mr. E. E. Grover, past-president of the Association and Mr. C. C. Bleach, senior vice-president, also spoke.

Scottish Gas and Electricity Cut

The Ministry of Fuel and Power announced last week that owing to the effect on the already serious coal supply position of the dispute in the Scottish coal mining industry, which had already lost the country 100,000 tons of coal, a 25 per cent. cut in the consumption of gas and electricity by Scottish industry and Scottish business premises engaged in the wholesale or retail distribution of goods had had to be imposed.

Faster Electric Cooking

Speaking at the annual luncheon of the South-East and East England (Eastern) Area of the British Electrical Development Association at Colchester on March 6th, Mr. E. E. Hoadley, immediate past chairman of the E.D.A., said it had been stated that in cooking electricity was slow, but he promised that after the war that position would be altered. He would be having delivered in the next three weeks a cooker with a plate that would boil three pints of cold water in five minutes. People should use electricity for heating and cooking and not merely for lighting and the wireless set. The present shortage of appliances was a matter of available labour.

At the business meeting Mr. A. Wade (East Suffolk Electricity Distribution, Ltd.) was re-elected chairman, and Mr. G. P. Dixon (borough electrical engineer, Colchester), vice-chairman. Mr. V. W. Dale, the general manager and secretary of the Association, spoke on the Association's activities and future plans.

M.P.'s Visit E.D.A. Kitchens

A group of Members of Parliament interested in the re-development of their badly bombed constituencies recently visited the British Electrical Development Association's exhibition of all-electric kitchens at the Building Centre, Maddox Street, London, W.1. Among those present were Mr. John Wilmot (Kennington), Parliamentary Secretary to the Ministry of Supply; Lady Apsley (Bristol); Mrs. Cazalet Keir (E. Islington); Mr. Aneurin Bevan (Ebbw Vale); Mr. F. G. Bowles (Nuneaton); Mr. G.

Buchanan (Gorbals Division of Glasgow); Mr. T. W. Burden (Park Division of Sheffield); Mr. W. Craven-Ellis (Southampton); Capt. A. S. Cunningham-Reid (St. Marylebone); Mr. F. C. R. Douglas (North Battersea); Mr. W. F. Higgs (Birmingham West); Mr. R. Moelwyn Hughes (Carmarthen); Mr. V. La T. McEntee (Walthamstow West); Mr. G. Muff (Hull East); Mr. S. S. Silverman (Nelson and Colne); Sir Oliver Simmonds (Duddeston Division of Birmingham); and Mr. G. R. Strauss (North Lambeth). The visitors were conducted round the exhibition by Mr. Clarence Parker, chairman, and Mr. V. W. Dale, general manager and secretary of the Association. They all expressed great interest in the kitchens.

E.D.A. Bulletin

Pictures of the Association's all-electric kitchens, which are on view until to-morrow (Saturday), are included in the February *E.D.A. Bulletin*. The front page is devoted to the activities of the Norwich Electricity Department in its adjacent rural areas, some parts as far as ten miles distant from the city. Some very satisfactory results have been achieved. Other matters dealt with include electric vehicle development, the new E.D.A. films and cookery courses for Service girls. The usual reports from the Area Committees and E.A.W. notes are published.

Motors in Power Stations

We are asked by Laurence, Scott & Electromotors, Ltd., to state that their "N-S" variable-speed AC motors, which (among other motors) were supplied for the induced-draught fans at Llynfi power station, are not speed-controlled by brush-shifting mechanism but by induction regulators and that the latter are incorporated in the Bailey automatic combustion control system mentioned on page 300 of our March 2nd issue. The same manufacturers supplied over seventy-five motors for Earley power station (described in our issue of February 23rd) for driving auxiliaries, including ten "Trislot" motors of 218/120 HP for induced draught fans and numerous others for forced draught fans, exhausters, pulverisers, 235 HP motors for circulating pumps and 250 HP for re-circulating pumps, etc.

Average Earnings

From time to time during the war the Ministry of Labour and National Service has issued statistics based on an inquiry into the average earnings and working hours of manual workers in the principal industries. The latest of these surveys, published in the *Ministry of Labour Gazette* for February, relates to the first pay week of July last year, covering approximately 53,000 establishments and nearly six million workers.

Earnings in individual industries are analysed in detail in one table which also gives the percentage increases over October, 1938. The latter are shown in parentheses in the following extract; women include part-time workers, taking two as representing one full-timer :—

Electrical engineering.—Men 132s. 2d. (78); youths and boys 44s. 11d. (81); women 64s. 7d. (99); girls 35s. 11d. (86); all workers 94s. (85). In the previous return for a week in January, 1944 (*Electrical Review*, September 8th, 1944, page 334) the corresponding figures were: men, 133s. 4d. (79); youths and boys, 43s. 10d. (77); women 65s. 7d. (102); girls 35s. 9d. (85); and all workers 94s. (85).

Electric cables, apparatus, lamps, etc.—Men 130s. 4d. (79); youths and boys 47s. 7d. (55); women 63s. 5d. (78); girls 36s. 11d. (77); all workers 85s. 7d. (71). For January, 1944, the figures were men 127s. 8d. (75); youths and boys 47s. 8d. (55); women 66s. 1d. (85); girls 36s. 7d. (76); and all workers 84s. 11d. (70).

Electrical contracting.—Men 127s. 9d. (61); youths and boys 38s. 5d. (82); all workers 98s. 3d. (73). January, 1943, figures were men 129s. 6d. (64); youths and boys 37s. 10d. (79); and all workers 96s. 3d. (70).

Electricity supply.—Men 110s. 11d. (53); youths and boys 36s. 11d. (41); women 72s. 3d. (no comparison available); all workers 103s. 9d. (51). In the previous return the figures were men 105s. 8d. (46); youths and boys 35s. 2d. (34); women 67s. 6d.; all workers 98s. 6d. (43).

Telecommunication Association

The annual general meeting of the Telecommunication Engineering & Manufacturing Association was held on March 1st at Brettenham House, Mr. T. G. Spencer in the chair. Mr. T. A. Eades and Mr. F. T. Jackson were unanimously elected as chairman and vice-chairman for the current year. The Association is at present negotiating with Government Departments on several matters of common concern to all firms in the industry, and several committees are dealing with technical subjects.

E.I.B.A. in Scotland

A further increase in revenue is recorded in the 1944 annual report of the Scottish Executive Committee of the Electrical Industries Benevolent Association which was submitted at the annual general meeting held at the Glasgow Corporation Electricity Showrooms on Tuesday. Total collections amounted to £1,962 and although grants paid to beneficiaries were higher (£982) there was an increased margin. Expenses incurred throughout Scotland including postage, stationery and advertising, did not exceed £31, or approximately 1·5 per cent. of the total collections. In issuing a rather fuller report than usual Mr. M. W. Hime, hon. executive secretary, says that the work is still largely borne by the select few and he looks forward to greater support in 1945 from others in the industry.

Course for Overseas Forces

This week an electrical engineering course for American and Dominion Forces is being held at the University Overseas Club, Birmingham, the organisers being the British Council and the South Midland Centre of the Institution of Electrical Engineers. The programme so far has included the following:—Monday: Reception. Tuesday: "Switchgear and Distribution," by D. Sayers, deputy city electrical engineer of Birmingham, and visit to G.E.C. works. Wednesday: "The Development of a Large Electric Supply Undertaking," by F. W. Lawton, city electrical engineer of Birmingham, and visit to Hams Hall power station. Thursday: "Post Office Communications," by W. H.

Brent, and visit to telephone exchange. To-day (Friday) the subject is "Works Installations," by F. C. Platt, chief power engineer of Guest, Keen & Nettlefold, Ltd., with a visit to I.C.I. Metals, Ltd., in the afternoon. Tomorrow there will be a talk on "The Central Electricity Board's National Electricity Grid Transmission Scheme," by W. S. Burge, manager of the C.E.B. (Central Midland area), followed by a farewell lunch. Film displays, a dance and a visit to the Birmingham Repertory Theatre were also arranged during the week.

Electricity on the Farm

About 200 farmers attended a demonstration arranged for the Notts War Agricultural Executive Committee at Mr. C. J. Neale's farm at Kneeton on February 22nd. Emphasis was given to the application of electricity to farm machinery. Mr. Neale's farm buildings are equipped throughout with electricity, which is used for grinding, winnowing and conveying corn, for driving cake breakers, food mixers, seed dressers, etc.

Retail Traders' Rally

To discuss the future of the independent retail trader, a rally is to be held on March 22nd, at 7 p.m. at the Conway Hall, Red Lion Square, Holborn, W.C. The Mayor of Holborn, Alderman Wilfred E. Mullen, J.P., will preside and the principal speaker will be Capt. L. D. Gammans, M.P., chairman of the Council of Retail Distributors.

Electric Washing Machines

The Board of Trade has agreed to a change-over by the North-West Engineering Co., Fleetwood, from its present work to the manufacture of electric washing machines.

U.S. Metal Production in 1944

The Bureau of Mines reported recently that output of lead from United States and Alaskan mines in 1944 amounted to 410,015 short tons and of zinc 715,806 short tons, representing decreases of 10 and 4 per cent. respectively on the figures for 1943. The American Iron and Steel Institute reported that the production of alloy steels last year amounted to 10,525,436 tons compared with the 1943 record figure of 13,149,818 tons.—*Reuter's Trade Service.*

Fatalities

Natural Causes.—A Birmingham woman was recently found dead in her home holding an electric kettle in her hand and at the inquest a son stated that when he touched her he felt a shock. A pathologist, Prof. Wilson, said that there was nothing to suggest death by electrocution and he considered that when the woman collapsed and died of heart failure the kettle continued to heat on a dry base until the insulation broke down, passing a slight shock to the body. A verdict of "Death by natural causes" was recorded.

Masseur's Death.—An inquest was held last week in Cardiff on Mr. J. T. Petersen (59), father of Jack Petersen, the boxer. It was stated that he was found dead in the radiant heat cubicle at his health centre where he carried on the business of masseur and physical culture expert. His shoulder was in contact with the elements of an electric radiator. The coroner said there could be no doubt that, in accordance with his custom after finishing the day's business, Petersen had taken a hot bath, and while his body was still wet, he had somehow or other fallen on to the radiator.

Trade Publications

Daly (Condensers) Ltd., West Lodge Works, The Green, Ealing, London, W.5.—Priced and dimensioned lists ("B" and "T" respectively) of block and tubular condensers of diverse capacities.

Geo. Bray & Co., Ltd., Leicester Place, Blackman Lane, Leeds, 2.—Leaflet dealing with low-loss and other ceramic insulators for radio and telecommunication purposes.

Ferranti, Ltd., Hollinwood, Lancs.—Descriptive list (IN.13) of a seven-range clip-on ammeter.

Radio Instruments, Ltd., Purley Way, Croydon, Surrey.—Illustrated catalogue containing dimensional data and technical details of transformers and chokes that will become available when materials are released for the purpose.

Wardle Engineering Co., Ltd., Old Trafford, Manchester, 16.—Abridged priced and illustrated catalogue (L.33) of lighting equipment for industrial and commercial uses, including porcelain lampholders, lamp posts, and mounting and suspension accessories.

Bound Brook Bearings (G. B.), Ltd., Birch Road, Witton, Birmingham, 6.—Illustrated brochure containing details and dimensions of "Compo" oil-retaining bearings and how they may be used.

The S.S. White Co. of Gt. Britain, Ltd., Britannia Works, St. Pancras Way, Camden Town, London, N.W.1.—Further papers for addition to Supplement II of the firm's treatise dealing with torsional remote control (flexible shafts) of instruments and switches.

Applications for these publications should be made on business letter-headings.

Trade Announcement

Troughton & Young, Ltd., state that their evacuation premises at Birtley House, Bramley, near Guildford, will be closed down to-day (Friday) and that all communications in future should be addressed to the London offices, Imperial Court, Basil Street, Knightsbridge, S.W.3 (tel. Kensington 8881).

Change of Name

Birmingham Electric Furnaces, Ltd., have changed their name to Birlec, Ltd.

TRADE MARKS

THE following applications have been made for trade marks. Objections may be entered within a month from March 7th.

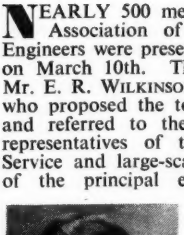
GLISSA.—No. 629,208, Class 7. Bearings and antifriction pads, all for machines; dynamo brushes and driving pulleys.—Aktiebolaget Pulverkemi, Thulegatan 15, Stockholm, Sweden. Address for service: c/o Frank Watson, Aldwych House, Aldwych, London, W.C.2.

FIBAC.—No. 631,309, Class 9. Scientific, nautical and surveying instruments and apparatus; electrical apparatus not included in other classes.—Bristol Aeroplane Co., Ltd., Filton House, Gloucester Road, Bristol.

Electrical Supervisors

Speeches at Annual Luncheon

NEARLY 500 members and guests of the Association of Supervising Electrical Engineers were present at the luncheon held on March 10th. The chair was taken by Mr. E. R. WILKINSON (President, A.S.E.E.), who proposed the toast of "Our Guests" and referred to the presence of several representatives of the Government, Civil Service and large-scale industry as well as of the principal electrical organisations.



Mr. E. R. Wilkinson, President A.S.E.E.

Referring to the Severn Barrage Scheme, he said that the amount of coal-fired generating plant would not thereby be lessened, since it would produce electricity only as the ebb tides permitted. The scheme would pay if the price of coal was about 50s. per ton or 20 per cent. more than at present—a prospect that he viewed with the gravest concern; at to-day's level the price was double that paid in America. Coal prices must decrease if we were to maintain our position in the world export markets and thereby maintain our standard of living. He recommended to the Government a review of the Weir Report on Railway Electrification of 1931, which, if fully implemented, would save some 10 million tons of coal per annum—more than ten times the saving expected from the Barrage. He concluded by urging as a means of retaining our export position the electrification of every process in every industry that would lead to even a fractional improvement in efficiency.

Mammoth Wind Tunnel

In responding Mr. A. T. Lennox-Boyd (Parliamentary Secretary, Ministry of Aircraft Production) divulged that his Department was working out with the Central Electricity Board a plan for supplying a new aeronautical research centre at Bedford with power equivalent to two-thirds of the output of Battersea power station, half of which would be needed within the first five years. The electrical requirements would include 100,000 HP for a wind tunnel.

Proposing "The Electrical Industry," Dr. C. H. Clarke (director, Lever Bros. & Unilever, Ltd.) attributed its outstanding achievements to its recognition of the value of research. Electrification of industry, he suggested, had been too slow, as 440 kWh per head of population compared with 771 in the United States indicated. Technical advice should be given to industrialists at the highest level and not only through salesmen.

Response was made by Sir Cyril Hurcomb (Director-General, Ministry of War Transport and Chairman, Electricity Commission), in the absence through illness of Sir Noel Ashbridge (Deputy-Director General, B.B.C.). He expressed the view that the Severn Barrage would be needed and that the country could not afford to neglect its water-power resources in spite of the vagaries of the lunar cycle. The Commissioners, he promised, would resume publication of statistical returns as soon as possible. Between 1938–39 and 1943–44, electricity sold for lighting, heating and cooking had increased by over 16 per cent. and power by close on 100 per cent. (to 21,000 million), the average for all purposes being 50 per cent. Man-power in the electricity supply industry had decreased by 25 per cent. and the average price had remained steady. But for the war, distribution voltages below the standard would have been raised; the work should proceed now before new developments were put in hand. He considered an agreed programme to be probable.

Dissemination of Knowledge

"The Association" was proposed by Sir Arthur Fleming (President, E.R.A.). With the rapidly changing conditions in the electrical industry, he said, the problem was how an electrical engineer could acquire all the knowledge he needed. Textbooks were quickly outstripped and for keeping electrical engineers up-to-date a great debt was owed to institutions and associations and to the technical Press. It was essential to lessen the time gap between the creation of new knowledge and its application. This country would be in competition with others having four and six times its population and would be depleted of its youth by the claims of the defence services and the need for policing the Continent. Great responsibilities for education and training rested with trade associations. He believed that the present voluntary basis for the continuation of education after the early compulsory period had expired, would pass.

He commended the measures taken by the A.S.E.E. for educating its members, in which Mr. J. Flood, its chairman, had shown a keen interest. Mr. Flood briefly replied indicating his appreciation of the tribute to his Association's efforts, but suggesting that the strain under which the members worked was not always properly recognised.

The D.R. Compass

Distant-Reading Gyro-Magnetic Type for Ships and Aircraft

ONE of the instruments recently removed from the secret list after five years experience in service is a distant-reading gyro-magnetic compass that has improved the precision of navigation. It has also increased the safety of aircraft because it is unaffected by sudden evasive manœuvres, sharp turns, quick acceleration, or rapid deceleration; varying air speed and changes of course do not reduce stability, while sluggishness does not result from the magnetic disturbance of armour-plate in and around the pilots' cockpit, or inaccuracy from interference by adjacent electrical circuits.

The instrument is normally capable of indicating a steady course simultaneously in different parts of an aircraft and, in addition, exercising a certain degree of control of the Mk. XIV bomb sight, the automatic pilot ("George") and master radio equipment. It is used by the Royal Air Force and Dominion air forces, the Royal Navy and the United States Army Air Force.

Credit for the initial conception is due to the Royal Aircraft Establishment at Farnborough. In 1937 the Air Ministry requested the Automatic Telephone and Electric Co., Ltd., to undertake the final development and quantity production, which resulted in conversion of the DC prototype for AC actuation. In accordance with Government policy that essential equipment shall be available from more than one source, Ferranti, Ltd., have also manufactured the D.R. compass, the basic principle of which is utilisation of the relative movement between a gimbal-mounted gyroscope and its outer casing to control an electrical transmission system for relaying to distant repeating indicating and actuating devices.

The master compass is generally situated in the tail of an aircraft, away from sources of magnetic and electrical disturbance and is connected to various components in other parts of the aircraft by wiring "harness" that is screened and bonded to minimise interference with radio and other electrical means of communication. The master element (Fig. 1) comprising gyroscope with north-seeking magnet and displacement transmitter weighs 20 lb. as installed.

The gyroscope, which is removable as a complete interchangeable unit, is spherical, one half being fixed and pivoted to the inner ring, while the other half is free to rotate about its axis, which is normally horizontal. The gimbal ring system aliows the gyroscopic axis freedom of movement within $\pm$ 75 deg. in pitch and $\pm$ 30 deg. in azimuth.

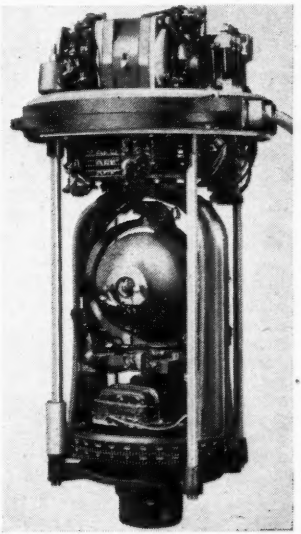


Fig. 1.—The compass with cover removed

The fixed half of the gyroscope forms the stator of a 3-phase squirrel-cage motor, which is energised by a rotary convertor mounted on top of the master unit and driven at about 3,000 RPM from the aircraft 24-V, DC supply. The free half of the gyroscope, consisting of a metal dome of very high electrical conductivity, is the rotor of the squirrel-cage motor revolving in a clockwise direction at about 12,000 RPM, which high speed renders the gyroscope very stable in space. The relative movement is employed to control the rotation of a reversing electric motor which, in turn, drives the transmission system to the repeater compasses.

The magnetic element (shown separately in Fig. 2) is beneath the gyroscope and the magnetic heading has an index pointer on a scale (bottom Fig. 1) visible through a window in the case of the master unit. The scale is fixed to the inner frame to which the gyroscope is also attached; the index is fixed to the outer frame, secured to the casing of the master unit and is therefore fixed relative to the attitude of the aircraft. To obtain a heading, the inner frame must be maintained in cardinal alignment while the outer frame, and consequently the index, turns with the aircraft. This condition is maintained by precessing and follow-up controls, both based on predetermined relationships be-

tween the compass magnet (meridian) and a datum-line on the inner frame and consequently upon that of the gyroscopic axis.

The precessing control comprises the compass magnet with a contact arm free to swing over a strip consisting of two insulated

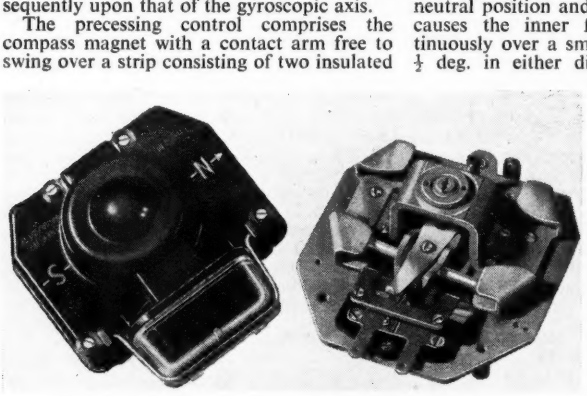


Fig. 2.—Magnetic element unit (cover removed)

segments. The contact is mechanically depressed by a clamp actuated by a cam on a gear box driven by the rotary convertor, which runs continuously, periodically making contact with the strip for two seconds in a five-second cycle. Each of the two strip segments is electrically connected to an electro-pot-magnet so that at any moment of off-centre (loss of predetermined relationship between the magnet and datum line) a circuit associated with one or the other pot-magnet will be energised for two seconds in each five-second cycle. Since the dome of the gyroscopic rotor revolves in close proximity to the pot-magnet (0·006 in. air gap) eddy currents are induced into the rotating copper dome. Their interaction with the field of the energised pot-magnet produces a drag on the same side of the gyro-rotor as the energised pot-magnet and so provides a torque which precesses the gyroscope in the desired direction.

This action takes place repeatedly in one sense or the other so long as the compass magnet is off centre. The periodical depression of the contact and clamp continues even when the magnet and datum-line are in alignment; but in this condition, however, since the contact is directly over the narrow insulated strip between the two segments, neither of the pot-magnets is energised and no precession takes place.

The follow-up control causes the inner frame to rotate in one direction or the other. Immediately beneath the gyroscope is a contact assembly of a strip divided into two segments abutting each other and attached to the gyro frame and a contact arm attached to the gimbal ring. One strip is an insulator (quartz); the other connects the coil of a 2-way relay through the wiping arm to opposite fields of a reversing motor (top, Fig. 1, behind the convertor) without a neutral position and consequently the motor causes the inner frame to oscillate continuously over a small angle (approximately ½ deg. in either direction) even when the magnet is in line with the meridian. This oscillation is prevented from being transmitted to the compass card by means of a "lost motion" device incorporated in the transmitter.

An error of not more than 1 deg. is due to the fact that during a turn the aircraft is normally banked and, since the magnetic element is doubly pivoted, it is deflected by the vertical component of the earth's field. During all normal movements the gyroscope, controls the compass scale and the magnet only prevents the axis wandering from its predetermined position. Simultaneous use of these two controls ensures a steady heading during all normal conditions of flight.

Indications of the displacement of the inner frame are passed to the repeaters

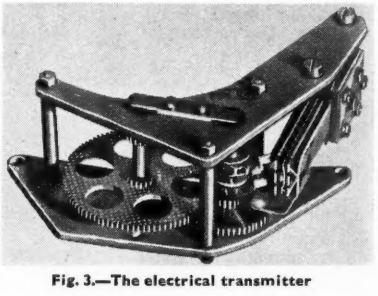


Fig. 3.—The electrical transmitter

by a 3-wire transmitter in the master compass (above the gyro-sphere, Fig. 1) to a separate 3-phase synchronous induction motor in each repeater compass.

The transmitter, which is shown in detail in Fig. 3, comprises three 3-way plate switches. Each middle leaf is free to contact either of the two outer leaves or remain neutral. These attitudes are controlled by the movement of three eccentric cams on a shaft gear driven by an electric motor in such a manner that the sense of transmission is changed simultaneously with displacement of the inner gyro-frame. The contour of each cam is made up of three radii at angular intervals and each cam is so set in relation

to the other two that a positive or negative supply or no potential can be transmitted to each of the three stator windings in all repeaters according to the sequence of the cam attitudes. In the course of one revolution there are twelve different combinations of separate characters whose periodic changes form impulses. Since each combination is different, the field at the stators results in a revolving magnetic field, with which the laminated motors align themselves synchronously. A similar drive gear in the reverse ratio is located in each of the repeater motors.

Angular displacement of the earth's field (along the magnetic meridian) from the true geographic meridian varies at different places and constantly changes even at the same place. In consequence, compass readings must be converted to true directions by calculation of the algebraic sum of variation and deviation. The D.R. compass has an automatic variation corrector which increases or decreases readings of the repeaters relative to the master. In effect, it comprises a repeater motor fitted underneath the case and a generator whereby an independent set of impulses is transmitted when the navigator sets the control knob according to the graduated scale.

Forthcoming Events

Saturday, March 17th.—*Manchester.*—Engineers' Club, 3 p.m. A.S.E.E. Manchester Branch. "Velocity Testing," by J. F. Bridge.

Monday, March 19th.—*London.*—39, Victoria Street, S.W.1, 4.30 p.m. Association of Mining Electrical and Mechanical Engineers. "Vibration in Rotating Electrical Machines and some Failures arising Therefrom," by H. West.

Birmingham.—Grand Hotel, 6 p.m. (tea, 5.30). Birmingham Electric Club. Annual general meeting, followed by a talk on "Distribution," by D. P. Sayers.

Bradford.—Technical College, 6.45 p.m. Bradford Engineering Society. "Production Technique of Industrial Plastic Mouldings," by E. M. Elliott.

Nottingham.—Corporation Gas Showrooms, Parliament Street. Nottingham Society of Engineers. "Electronics in the Engineering Industry," by Dr. W. Wilson.

Tuesday, March 20th.—*London.*—Institution of Electrical Engineers. 5.30 p.m. Radio Section. Discussion on "Apprenticeship and Trainee Systems in the Radio Industry," to be opened by Dr. J. Greig.

London.—Lighting Service Bureau, Savoy Hill, W.C.2, 6.15 p.m. Association of Supervising Electrical Engineers. "Estimating and its Relation to the Economics of Electrical Contracting," by W. H. Brooks.

Leeds.—Great Northern Hotel, Wellington Street, 6 p.m. I.E.E. North Midland Centre. "Operational Control of Electricity Supply Systems," by W. Kidd and E. M. S. McWhirter.

Luton.—Town Hall, 7.30 p.m. Luton Electrical Society. Discussion on the booklet, "Electrical Installations" (Post-War Building Studies No. 11); résumé by A. F. Plummer.

Wednesday, March 21st.—*London.*—Imperial College of Science, Kensington, S.W.7, 5.30 p.m. Illuminating Engineering Society and the Royal Meteorological Society. "Measurement of the Photometric Properties of the Upper Atmosphere," by J. M. Waldram.

Loughborough.—At Loughborough College, 2.30 p.m. I.E.E. East Midland Sub-Centre. Short papers by junior members.

Thursday, March 22nd.—*Chester.*—Assembly Room, Town Hall, 6 p.m. I.E.E. North-Western and Mersey and North Wales Centres, and the Chester Engineering Society. "The Electrical Aspect of Farm Mechanisation," by C. A. Cameron Brown.

Friday, March 23rd.—*London.*—Institution of Mechanical Engineers, 5.30 p.m. Joint meeting with Institution of Electrical Engineers, "Expanded Tube Joints in Boiler Drums, with Special Reference to the Battersea High-pressure Boilers," by W. B. Shannon, C. W. Pratt, T. B. Webb and W. B. Carlson.

London.—Room 19, Livingstone House, Broadway, S.W.1, 6.30 p.m. E.P.E.A. Southern Divisional Meter Engineers' Group. "Precision Meter Testing," by G. L. Campbell.

Birmingham.—Imperial Hotel, 6 p.m. Illuminating Engineering Society (Birmingham Centre). "Some Visual Problems for Illuminating Engineers," by Dr. W. D. Wright.

Loughborough.—At 7 p.m. I.E.E. South Midland Students' Section. "Electrical Technique in Resistance Welding," by T. E. Calverley (date altered from March 16th).

Manchester.—Engineers' Club, 6 p.m. I.E.E. North-Western Centre Radio Group. Informal discussion on "Recording and Reproduction of Sound," to be introduced by F. E. Williams.

Manchester.—Engineers' Club, 6.30 p.m. Manchester Association of Engineers. Annual general meeting.

Manchester.—Reynolds Hall, College of Technology, 6.30 p.m. Institution of Electronics (N.W. Branch). Lecture on "Pulse Generation," by Dr. F. J. G. van den Bosch. Non-members may obtain tickets from L. F. Berry, 14, Heywood Avenue, Ansterlands, Oldham.

Saturday, March 24th.—*Newcastle-on-Tyne.*—I.E.E. North-Eastern Students. Visit to King's College Electrical Laboratory (ladies invited).

Monday, March 26th.—*London.*—Institution of Electrical Engineers, 5.30 p.m. Informal discussion on "The Future of Synthetic and Thermoplastic Insulated Cables," to be opened by T. R. Scott, D.F.C.

Birmingham.—James Watt Institute, 6 p.m. I.E.E. South Midland Centre. Discussion of the Installation Section of the report on "Electricity Supply, Distribution and Installation," and of "Post-war Building Studies, No. 11: Electrical Installations." Opener, W. N. C. Clinch. Responder, J. Beard.

Newcastle-on-Tyne.—Neville Hall, 6.15 p.m. I.E.E. North-Eastern Centre. Lecture on "An Elementary Description of the Molecular Theory of Permittivity and Energy Loss in Dielectrics," by Dr. E. B. Moullin.

War-Damaged Premises

Conditions for Reduction of Rent

By F. E. Sugden,
A.C.I.S., Barrister-at-Law

WHAT is the position of the electrical contractor whose rented premises are damaged by enemy action? In this article I assume that the tenancy is terminable by weekly, monthly or quarterly notice and that the contractor has a shop with living accommodation above it, particularly where it is still possible to carry on business, but the living accommodation has been rendered uninhabitable. The point I wish to discuss here is not whether the premises should be repaired, that is dealt with by the local authority, but whether the contractor should continue to pay the full rent. In my opinion he should not, but he cannot simply say, "I refuse to pay any more rent"; that is impossible, he must take legal steps.

Tenant's Furniture

Although the premises are unfit to live in, the tenant's furniture probably remains, and he may still visit the premises from time to time for the purpose of removing the furniture or seeing that it is properly protected. In fact he may retain the key, but no rent is payable until the premises are again made habitable, or if part of the premises is damaged and the tenant lives in the remainder, a reduced rent may be paid. This new rent may be mutually agreed between the landlord and the tenant, in which case the matter is settled. But if they cannot agree, which is usually the case, legal procedure has to be followed.

First of all the contractor should go to the Town Hall, see the Valuation Officer and apply for a reduction of assessment. Incidentally, as a member of a borough council myself and of its Assessment Committee, I may say that councils look very sympathetically on these cases and the dissatisfaction of the tenant from the rating point of view is rare. I give this advice although the reduction of assessment has nothing to do with the rent and the landlord, even though they are to a certain extent inter-related.

Reverting to the reduction of rent, if a new rent cannot be mutually agreed, the tenant should first of all write to the landlord asking him to reduce the rent and making a reasonable offer. If the landlord either ignores the letter or rejects the offer, or makes a counter-offer which is unsatisfactory, then the tenant should apply to the Registrar of the County Court of the district in which his premises are situated for an apportionment of rent in accordance with the Landlord and Tenant (War Damage) (Amendment) Act, 1941. The term "apportionment of rent" relates to the fixing of the amount for the habitable part of the premises as distinct from the uninhabitable part, disregarding, of course, the presence of the furniture in the premises.

The landlord or tenant of any premises let on a short tenancy may at any time apply to the Court to determine whether the premises are or were at any time unfit by reason of war damage, or any other question arising under the Act. Where however a Notice of Disclaimer or a Notice of Retention has been served, before the passing of the Act, what I have got to say does not apply.

The Judge, after certain legal formalities, will determine whether the premises are fit for habitation, or whether a portion only is fit for habitation, or determine what amount should be paid by way of rent for the fit portion of the premises having due regard to the whole premises. I have purposely omitted to detail the legal formalities at this stage to simplify matters. The County Court Judge who hears the case will be guided by a surveyor's report on the condition of the premises, or better still a report from a senior official of the borough council, such as the surveyor, who can speak as to the condition of the premises, if necessary supported by a certificate from the borough council to show the condition of the premises prior to the court proceedings.

Question of Costs

I should certainly give the landlord every opportunity of compromising over the rent before taking proceedings. I always suggest this course professionally because the question of costs is involved. The County Court Judge has discretionary power in this respect and he is usually guided by the circumstances of each individual case. If, for instance, the tenant has done all in his power to come to an amicable settlement the Judge will award costs against the landlord. If on the other hand both the landlord and tenant have been difficult with one another, and have not tried to come to some solution, he will probably order both tenant and landlord to pay their own costs. If the tenant has made unreasonable, obviously unacceptable, offers to the landlord, then no doubt the Judge would award the whole of the costs against the tenant.

Z.D.A. Abstracts. — Abstracts of technical literature issued at about monthly intervals by the Zinc Development Association are now being printed instead of "cyclostyled" and this has made it possible to increase the number of copies circulated.

B.S.I. Luncheon

Proposed National Mark

THERE was a large attendance at the British Standards Institution's luncheon at the Savoy Hotel last week when the first president, Lord Woolton, was introduced to members. He was elected at the annual general meeting in October, 1944.

Sir John Greenly (chairman, Babcock & Wilcox, Ltd.), presided and, in proposing the toast of "The President," remarked that the achievements of the B.S.I. were well known. One had only to look back to the reasons for its foundation (avoidance of multiplicity of types and sections, designed for suitability without regard for economic production) to realise why it must continue to play an important part in industrial progress by rendering manufacture economic and continuous. The B.S.I. had fully lived up to its early aims and aspirations, never undertaking standardisation without a request from some section of industry or Government Department; there was never any attempt at arbitrary control. "British Standard" had come to mean something at home and overseas; if the expression could be given legal status it would have a great influence on export trade.

Lord Woolton (Minister of Reconstruction), responding, said that his experience in various Government Departments had taught him the value of standardisation. The number of war-emergency specifications was enormous, but without them the Army could not have been clothed in so short a time nor could the speedy production of munitions have been organised. By laying down quite clearly what was wanted, they made production much easier for industry that had to be scattered. They saved much time and facilitated the most effective application of productive effort. If so much had been done in wartime, what could not be done in peace towards increasing output and lowering cost. Standardisation was not merely the concern of large manufacturers, for it guaranteed quality to the general purchasing public which needed to understand that by asking for goods made in conformity with B.S.S. it would obtain protection. If a national mark were desired which no one would dare to desecrate, Lord Woolton said he would do all he could to assist and did not think it would be difficult to induce his colleagues to agree.

Sir Percy Ashley (vice-president) deputising for Sir William Larke (chairman of the General Council) who was unable to attend owing to illness, proposed the health of the president.

Machinery in Tankers

Comparison of Steam and Electricity

COMMENTS on the performance of machinery in tanker ships from the user's point of view rather than the manufacturer's are made in a paper submitted by Mr. J. N. HENDRY (marine superintendent engineer, Hunting & Sons, Ltd.) to the North-East Coast Institution of Engineers and Shipbuilders.

Both steam and electrically driven engine room auxiliaries are used in various tanker fleets, with a possible leaning towards steam among British owners and builders due perhaps to the greater expense of electrical equipment in this country than on the Continent. The general tendency is to favour lighter and faster running machines of the totally enclosed type with forced lubrication. Electrically driven equipment is of a high order, when fitted, but there has been a tendency of late to step-up the speed of the oil engines driving the generators.

The author's experience is that the heavy fuel oils used for the propulsion plant are more suitable for auxiliary engines developing up to 150 kW at 350 to 450 RPM. For the four-stroke type of from 30 to 70 kW at 750 to 1,150 RPM a light Diesel or gas oil should be used for the sake of continuity of service over the periods necessary to normal tanker trading.

There is also a general tendency for makers and shipbuilders to over-rate auxiliary oil engines. Overloading means continual overhaul and adjustment, which can have a very disturbing effect on the engine-room staff.

Motors and generators suffer in no small measure from impregnation of their coils and winding by oil suspended in the atmosphere. Extractors or venting means fitted to the crank chamber would help, while more effective filtering of air before its entry to the armature spaces would be an improvement. To be compelled to remove armatures and coils for cleaning at comparatively short intervals is a costly business.

Steam steering gear is still the simplest and cheapest. Electro-hydraulic and direct electric gear, which are decidedly more expensive in first cost, are fitted to a limited degree on medium sized tankers; when they are installed it is advisable that an electrician should be on the engine-room staff.

A recent American development in turbo-electric tankers is the use of an electrically driven centrifugal cargo-oil pump. But classification societies prohibit electrical machinery and wiring of any kind being fitted in the pump rooms of spirit-carrying vessels. Accordingly the pump room is placed right aft of the cargo tanks with a cofferdam between it and the engine room; the motor is in the latter, driving through two bulkheads fitted with gastight glands which are suitably cooled.

Engine-room illumination has improved in the last few years, but additional well-placed permanent fittings are desirable, particularly about the auxiliary engines.

Auxiliary equipment is still the major problem; the tendency to use Diesel-electric or turbo-electric drives for these services will add considerably to the first cost of the vessel. The standard type of 14,000-ton American tanker with turbo-electric drive costs to-day about £700,000 which at pre-war freight rates would be a formidable handicap.

Location of Industry

I.E.E. Informal Discussion

AT an informal meeting of the Institution of Electrical Engineers on February 26th, MR. D. B. WILLIAMSON opened a discussion on the location of industry and gave a brief outline of the Barlow, Scott and Uthwatt Reports, indicating in broad outline the part that electrical engineering might be called upon to play in implementing the proposals. In his view engineers generally, while rightly occupied with the provision of adequate services to the houses themselves, had been less concerned with ensuring that the houses when built were placed in suitable locations, judged from the national interest and that of the occupiers concerned.

He suggested that an electrical advisory service should be set up to give guidance on questions of availability of supply, tariffs, and the like, in the various parts of the country, and also to make known the needs of the light electrical and manufacturing industry, which could be regarded as mobile and would form a valuable addition to the existing range of industries in the areas of many local authorities. In his opinion the establishment of such small industrial units in country towns would accelerate general rural electrification and tend to a levelling between urban and rural tariffs. Furthermore, the added amenities brought to the small country towns by electricity might limit the drift of population to the cities. The Scottish hydro-electric project and the Severn Barrage scheme, if adopted, would also support the trend of dispersal from the present industrial concentrations at the coalfields.

In the general discussion it was emphasised that whereas national considerations might suggest that a certain industry should not be established in a particular area, alternative sites might lack the necessary facilities and amenities, and it was strongly urged that the latter consideration should not be overlooked. Attention was called to the great disinclination of people in this country to being uprooted from their usual surroundings and transferred elsewhere, and of the need for special steps to be taken to encourage workers to see the wisdom of any such proposal.

It was generally recognised that at the present time there was very little evidence on which to base planning of the long-term kind. As to the need for ensuring that supplies of electricity would be available in any new part of the country that was chosen, it was agreed that this could now be taken for granted, such was the ability of the supply industry to meet all the demands of this kind that might be made upon it. The laying out of industrial estates under generally attractive conditions was referred to, and the difference between basic industries and finishing industries was emphasised, it being stated that it did not matter very much where the latter was placed, as the cost of electric power was rarely more than 3 to 5 per cent. of the total cost of production. One speaker, emphasising the technical side, drew attention to the benefits in thermal efficiency that would accrue from the use of process steam from the power station, in factories needing low grade heat which could be grouped around the site, apart from any other benefit that might result from the application of methods of district heating which had found favour overseas.

Mr. Williamson, in the course of his reply, remarked that the lack of full information on all matters influencing the location of industry was surely a powerful argument for electrical engineers to focus attention on those aspects of which they had a specialised knowledge.

American Appliance Outlook

Reduction in Number of Models

IN the United States much is being said and written about post-war markets for all kinds of goods. Although management and labour alike are devoting themselves almost exclusively to war production, leaders of industry continue to keep alive the question of post-war production and distribution within the United States. A New York correspondent says that leading electrical manufacturers plan to devote their facilities to the production of appliances already familiar to the buying public, but models of particular appliances will be cut in both number and type. The American General Electric Co., for instance, will introduce its post-war refrigerator in about six models as opposed to the pre-war figure of thirty-two.

In a recent speech before the South-Eastern Electric Exchange J. H. Ashbaugh, vice-president of the Westinghouse Electric & Manufacturing Co., discussed the problems of reconversion. He said that physical reconversion of factories from military to peacetime work would not be the same for any two plants; on the average, allowing for minor differences, the time needed for changing over the electrical domestic appliance business would be from five to six months after relaxation of restrictions.

American factories will produce goods for a market which is reputed to represent $27 billion of deferred demand. With an estimated $100 billion in savings, $60 billion of which is highly liquid in cash and Government bonds, the American market will offer the manufacturer a ready group of customers. It is not thought that there will be an immediate rush. People are likely to wait for a year or two more, if they can, to buy the much improved models which advertisements have promised them. Most electrical manufacturers are, therefore, not expecting to be snowed under by any pent-up demands or stored-up wealth. It is thus possible that the war's end will see the electrical industry with sufficient goods on hand, once production is resumed, to allow for export to foreign markets.

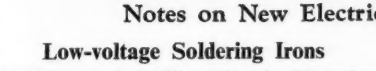
Electrical manufacturers are hesitant to discuss post-war markets outside the United States. Too many unpredictable factors, involving political and economic relations with various countries, are involved. They feel that whatever they may say about export trade must be premature and highly speculative.

RECENT INTRODUCTIONS

Notes on New Electrical and Allied Products

Low-voltage Soldering Irons

THE increased use of low voltage in all branches of industry, chiefly as a safety measure for operators, has led to the addition of two models to the range of "Solon" electric soldering irons made by W. T. HENLEY'S TELEGRAPH WORKS CO., LTD., Milton Court, Westcott, Dorking, Surrey. They are suitable for 12 and



"Solon" low-voltage soldering iron

24 V respectively, are rated at 65 W and are capable of the same work as the well-known types of the same wattage for normal voltages.

The two models are alike in design and are constructed from similar standard parts, with the exception of the elements and flexible leads. The elements are wound on mica formers and the element tails comprise silver wires with bead insulation. The flexible leads for both of the new models are twin core, that for the 12 V being 16/·012 in. (equivalent to 40/·0076 in.) and for the 24 V 9/·012 in. (equivalent to 23/·0076 in.). Two types of bit are fitted, the well-known oval tapered or, alternatively, a replaceable round pencil. The new models have withstood the usual 2,000 hours life test.

Vitreous Resistors

In addition to the vitreous enamelled resistors hitherto manufactured by the BRITISH ELECTRIC RESISTANCE CO., LTD., Queensway, Ponders End, Middlesex, a fresh range of sizes has been developed with the objects of facilitating greater standardisation for interchangeability and improving mechanical strength. This type is to be known as the "Bercohm Standard" and it complies fully with tropical specifications for Service equipment.

By using one common diameter for all ratings and increasing the length of tube to accommodate greater heat dissipating capacity, it has

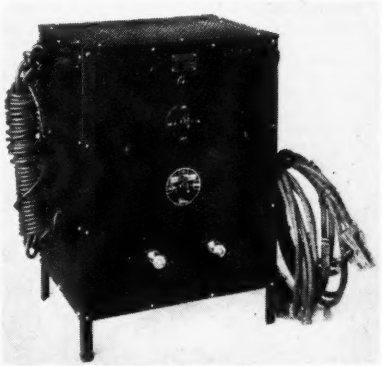
Standardised vitreous enamelled resistors

become possible to employ one common spring clip, mounting and contact. The resistor can be mounted like a fuse and is as easily replaced, but it has an additional clamping screw so that the spring clip may be tightened to form a positive shake-proof mounting. By utilising a tube of somewhat larger diameter than hitherto, free circulation of air through the bore is assisted, thus resulting in better cooling which keeps the temperature rise moderate.

The eight sizes made are rated at from 45 to 260 W; but another range of much smaller size, known as the LW series, which is in production, will be available in six lengths with ratings of from 6 to 30 W.

An Electric Pipe Thawer

A step-down transformer outfit, all-enclosed in sheet metal with an expanded metal top for ventilation and lifting straps at the sides, for the electrical thawing of frozen water pipes is offered by RUNBAKEN ELECTRICAL PRODUCTS, 71, Oxford Road, Manchester, 1. The output



Pipe-thawing transformer

is variable, being regulated by a multi-position switch and indicated by a meter, up to 2,000 A being delivered at from 3 to 4 V. The equipment is quite simple to use and is shock-proof.

Detecting Device

A useful device for detecting magnetic substances in liquids and powders is available from JAMES NEILL & CO., LTD., Napier Street, Sheffield, 11.

It is an "Eclipse" permanent magnet with a quick release lever for rotating the cylindrical magnet within the body, thus releasing the load; turning through a larger angle will reverse the polarity and so throw off the smallest particles which might otherwise adhere to the pole pieces. To the latter can be fixed, by means of dowel pins and screws, suitably shaped dipping prongs for intensifying the gap density. It is claimed that as little as one part in a hundred thousand can be detected in this way. The device is conveniently handled; it weighs a little less than 5 lb. The magnet can hold 60 lb. in favourable conditions.

ELECTRICITY SUPPLY

Leeds Power Charges. Manchester 1945-46 Estimates.

Accrington.—INSTALLATIONS IN TEMPORARY HOUSES.—The borough electrical engineer estimates that the cost of providing the necessary services for, and installations in, the temporary houses which the Corporation is to erect will amount to £4,851. He has been authorised to carry out the work at the appropriate time.

Barrow-in-Furness. — CHANGE-OVER. — The Electricity Committee is seeking sanction to borrow £5,000 for the completion of the change over.

Birkenhead.—CONSULTANTS' FEES.—The Electricity Committee is asking Merz & McLellan to agree to a fee of 4 per cent. on the first section of the new power station (£3,500,000) and to discuss the rate in respect of the second section.

SUPPLY TO TEMPORARY HOUSES.—The Electricity Committee is to lay mains, etc., for the provision of supply to 120 temporary bungalows at a cost of £4,614.

Cardiff.—LIGHTING PROPOSALS. — The Corporation has appointed a joint sub-committee to consider the suggested conversion of street gas lamps to electricity. The question of installing flurorescent lighting in the City Hall has also been raised and the city electrical engineer has been asked to report on the matter, with cost estimates.

Chester.—RURAL EXTENSIONS.—The Electricity Committee is to provide a supply to farmers and others in the parish of Rushton at a cost of £1,500 and extend supply in the Lache area at a cost of £9,900.

Clitheroe.—ELECTRICITY FOR POULTRY FARMS. —As from January 1st, the charges for electricity supplied by Clitheroe Corporation to poultry farmers are: First 1,000 kWh per quarter, 1d. per kWh; over 1,000 kWh per quarter, ¾d. per kWh.

Darwen.—RATE AID.—The Electricity Department is to contribute £1,000 towards the relief of the rates.

Durham.—FOUNDATIONS AT KEPIER SITE.— A denial has been given by the North-Eastern Electric Supply Co., Ltd., of a published report that the plan for a new power station at Kepier had been abandoned on the grounds that it had been found that the foundations were not suitable. The company states that there is no truth whatever in the report. At the inquiry into the power station plan last December, it was stated that the Kepier site fulfilled all requirements.

Ealing.—ALL-ELECTRIC HOUSES.—The Town Council has decided that all temporary houses to be erected within the borough shall be all-electric.

Hastings.—SUPPLY TO PUMPING STATION.— The Electricity Committee has arranged with the Bexhill Corporation to provide electricity supply to the pumping station at Ninfield at a cost of £2,613.

SANATORIUM INSTALLATION. — The Town Council proposes to modernise and improve the lighting and electrical equipment at the borough sanatorium at a total estimated cost of £736.

Leeds.—POWER TARIFFS.—The City Council has approved a resolution by the Electricity Committee that the 5 per cent. increase in electricity charges approved some months ago, which was not applied to tariffs subject to a coal price clause, should now be extended to those tariffs also. The question of suspending the 5 per cent. discount allowed to power consumers has been referred to the Finance and Parliamentary Committee for consideration.

London.—POPLAR'S DEFICIT.—Poplar Electricity Committee reports a net deficiency of £43,121 for the year.

Manchester.—1945-46 ESTIMATES.—The estimated income of the Electricity Department for the year to March 31st, 1946, is £2,853,000, or an increase of £304,000 on the amount for the year now drawing to a close. Expenditure is put at £2,827,000, or £222,000 more than for the present year. The increased expenditure is mainly due to the high cost of fuel and advances in wages. The estimated surplus for the year is £25,800 compared with a deficit of £56,000 for the current year.

PLACING OF STEELWORK CONTRACT.—Alderman Sir William Walker was questioned at the City Council meeting last week about a steelwork contract for the reconstruction of the Stuart Street boiler house and turbine house. He said that local and other tenders were received but they were all for the same amount, down to a single farthing. The committee considered which of the tendering firms was best equipped in experience and in other respects.

DISTRICT HEATING PROPOSALS.—The Housing Committee suggests that Ernest Griffiths & Son, of Bromborough, should be retained as consulting engineers to prepare detailed schemes of district heating for certain housing estates, together with schemes in principle in regard to the possible extention of the system to the industrial area and the incorporation of electricity generation.

Mansfield.—PREPAYMENT TARIFF.—It being now impossible to obtain two-part tariff prepayment meters, the borough electrical engineer suggested to the Electricity Committee that as the supplies to temporary houses would be charged under the domestic tariff, a weekly fixed charge should be made and that a "straight" slot meter calibrated at ½d. per kWh should be installed in each house. He further suggested that possible arrangements could be made for the weekly fixed charge to be collected by the Housing Department with the rents. The Committee decided to bring the subject before the Housing Committee.

DISTRIBUTION WORKS.—Provision of a supply to a housing estate at New Houghton is estimated to cost £5,280. In addition the construction of substations is planned on the Goodacre estate (£1,224) and at Titchfield Park and Littleworth, with mains extensions (£5,150).

Nairn.—HYDRO-ELECTRIC VALUATION BILL.— The County Council at its last meeting expressed the opinion that the Hydro-Electric Undertaking (Valuation and Rating) Bill should make provision that no dwelling houses should form

part of the undertaking and that all such houses should be entered in the local valuation roll. The council also agreed with the view of the County Councils' Association that Clause 3 (2) of the Bill appeared to give the Electricity Commissioners power to decide what works of the undertaking were "generating works". The function of deciding what works fell within that term should, it was considered, remain with the Valuation Appeal Court.

Norwich.—LOANS FOR HOUSING REQUIREMENTS.—Application is being made for permission to borrow £10,000 for the purchase of 560 new cookers, £7,000 for providing substations, mains, etc., in connection with the redevelopment of a clearance area for housing purposes, and £7,560 for similar requirements for 312 temporary houses on two other sites.

Salford.—PROPOSED INCREASE IN CHARGES.—Application is being made for permission to increase all "unit" rates of charge for the supply of electricity which are not subject to a coal price variation clause by one-tenth of a penny at the commencement of the September quarter next.

LOAN APPLICATION.—The Corporation is seeking sanction to borrow £1,000 for electricity meters and £4,000 for consumers' apparatus.

Sheffield.—POWER STATION EXTENSIONS.—The Electricity Committee has obtained sanction to borrow £1,300,000 for extensions at Neepsend power station.

Workington.—NEW SUBSTATION.—The Electricity Committee is to erect an 11-kV substation in Oxford Street at a cost of £9,680.

Overseas

Argentine. — FUTURE DEVELOPMENT. — The probable growth of electrification in the next ten years is surveyed by Ing. Gustave Sorojovich in a recently published book "La Electrificación de la República Argentina y su Próximo Desarrollo." He estimates that the total output in 1955 will be 8,560 million kWh with a plant capacity of 2,814,000 kW. In 1941 the total output was 2,644 million kWh. He considers that there is a considerable future for wind-driven generators, which, although not so reliable as hydraulic plants, have certain advantages for Argentina in that they can be constructed anywhere. It has been calculated that the total potential hydraulic power of the country amounts to 20,000,000 kW, but the sources are absent where they are most needed.

Brazil. — NEW TRANSMISSION LINE. — The Federal Government has recently authorised the Companhia Paulista da Forca e Luz to construct a 66-kV transmission line 118 km. long to connect the Avanhandava plant directly with Marilia, thus supplying this important area of the State of Sao Paulo with electrical energy. The estimated capacity of the Avanhandava plant, which is at present under construction, is 42,600 HP.—*Reuter's Trade Service.*

Canada. — SASKATCHEWAN ACQUISITION. — It is reported in the *Financial Times* that the Saskatchewan C.C.F. (Socialist) Government has concluded negotiations for the purchase of the common stock of the Dominion Electric Power, Ltd., at a cost of about $450,000. The acquisition is regarded as marking the first step by the Government in a programme of expansion of the Saskatchewan Power Commission's services.

Eire. — GASWORKS CLOSES. — Longford gasworks, which has been in existence for over half a century, has closed down because of lack of coal and the Urban Council has been told that there is not the slightest chance of the works reopening. The Council is asking the E.S.B. to supply former gas consumers with electricity.

New Zealand.—PROGRESS OF HIGHBANK SCHEME.—During a visit to the new Highbank hydro-electric station towards the end of last year the Minister of Works (Mr. Semple) said that the last of the machinery had arrived at Lyttleton and the station was expected to be in operation early this year. The station houses a single 28,000-kW generator.

Tasmania.—FINANCING RURAL EXTENSIONS.—In a recent memorandum on the Government's rural electrification policy (*Electrical Review*, January 26th, page 141), the State Electricity Commission referred to a Bill which was before the Tasmanian Assembly. This Bill, which has now been passed, places on the Government the responsibility of finding the money for rural supply extensions and removes the necessity for consumers to provide guarantees.

TRANSPORT

Eire.—DRUMM BATTERY TRAINS.—Replying to a question in the Dail, last week, Mr. Sean Lemass, Minister for Supply, said that owing to the shortage of electricity in Eire it was not proposed to put any more Drumm battery trains into operation at the moment.

Southern Railway.—ELECTRIFICATION SCHEMES.—Plans for the extension of electrification for both passenger and freight trains were referred to by Col. E. Gore Browne, chairman, at the annual general meeting on March 8th. Preliminary schemes were now being investigated and their acceptance by the board must depend on a sound assessment of the economic factors involved. Considerable initial expenditure would be required and they could only embark on these schemes if they were assured of a defined and settled national policy for transport as a whole.

RADIO and TELEPHONY

Dutch Guiana.—NEW RADIO-TELEPHONE SERVICE.—Cable & Wireless, Ltd., announces the opening of a radio-telephone service between Port-of-Spain, Trinidad, and Paramaribo, Surinam (Dutch Guiana).

United States.—RADIO CORPORATION'S INCREASED INCOME.—The Radio Corporation of America reports a net income for 1944 of $10,263,291, equal to 51 cents per common share, compared with $10,192,452 (equal to 50 cents) for 1943. Gross income rose from $294,535,362 to $326,421,913, but higher operating costs and taxes left little more net income. Brigadier General David Sarnoff, president, said that the corporation was now making 200 new types of electron tubes and 350 types of apparatus not made before the war.

FINANCIAL SECTION

Company News. Stock Exchange Activities.

Reports and Dividends

Electrical Distribution of Yorkshire, Ltd., reports gross receipts in 1944 of £933,682 against £850,004 in the previous year, but the net profit was lower at £220,726 (against £242,043). With £58,439 brought forward this makes £279,165 available. After meeting the dividend on the cumulative preference stock, maintaining the ordinary dividend at 9 per cent. by a final payment of 4½ per cent. and allocating £115,000 (same) to the depreciation and reserve fund a sum of £58,165 is carried forward. There is this year no appropriation for the war damage contribution reserve fund; last year £20,000 was set aside.

In a statement accompanying the report and accounts, the chairman (Mr. R. W. Wickham) says that the Government has still not disclosed its plans for the reorganisation of the electricity supply industry. The uncertainty caused by this lack of decision, coupled with the knowledge that many local authorities are indicating their anxiety to exercise their rights to take over the most remunerative parts of the undertaking which the company has built up, is a matter of serious moment. In any ordinary industry this would justify the adoption of a "wait and see" attitude, but this could not be so in the provision of a necessity. Accordingly the company, so far as possible with its depleted staff, has prepared plans for proceeding with the development of the undertaking when men and materials are available.

All the subsidiary companies are continuing satisfactorily. Due to the war it has not been found practicable to merge the Tadcaster and Settle companies into the Electrical Distribution of Yorkshire, Ltd., and for the time being they must continue to operate as separate entities.

The Midland Electric Corporation for Power Distribution, Ltd.—In a statement accompanying the accounts Sir Alexander Roger, the chairman, points out that wartime restrictions on development have naturally been reflected in much reduced capital expenditure, which for the five years 1940-44 was £357,171, or an average of about £71,500 per annum, as compared with an average of over £240,000 per annum for the previous five years. After the war the directors have every intention of continuing their policy of vigorous expansion and plans have been completed, awaiting only the release of labour and materials, for the further development of the company's area, both urban and rural. Sales of energy have increased from 190,162,042 kWh in 1939 to 313,634,766 kWh in 1944, while the total connections have risen from 204,710 kW to 314,116 kW.

The Northmet Power Co. proposes to pay a final dividend of 4 per cent., making 7 per cent. for the year ended December 31st. The balance from working, including interest and dividends, was £927,300 compared with £860,891 for 1943. Interest payable was £75,097 (£75,877), redemption of debenture stocks £47,387 (£47,387), provision for depreciation was £457,448 (£405,229) and £50,000 (nil) was set aside for War Damage Contribution. Income tax on profits for the year and the dividends recommended require £268,238, leaving £72,409 (£43,279) to be carried forward.

The West Gloucestershire Power Co., Ltd., reports a profit for 1944 of £171,167, as compared with £178,006 in 1943. Income tax and E.P.T. absorbs £92,500 (£118,500), general reserve £43,865 (£55,985), debenture stock sinking fund £8,889 (£8,493) and the dividend on the 6½ per cent. non-cumulative participating preference shares £16,952 (same). The ordinary dividend is increased from 3½ to 4 per cent. and £5,266 (£2,275) is carried forward.

The chairman, in his statement, points out that although there is much talk of nationalisation of industry and specially of public utilities, it has still to be proved that under public control the disadvantages under which the companies have laboured, particularly poor output and high cost of coal, can be remedied and equal enterprise shown.

The London Electric Supply Corporation, Ltd.—The 1944 accounts show a gross revenue £88,000 greater than in 1943, while expenditure has increased by £64,533. The profit is £53,493, which with £10,888 brought forward and £22,101 interest from investments, etc., makes a total of £86,482. Preference dividend absorbs £41,952 and an ordinary dividend of 4 per cent. leaves £9,565 to be carried forward. The ordinary dividend is supplemented by drawing on the No. 2 reserve fund for a further 2 per cent., making a total dividend of 6 per cent. (same). Sales of energy amounted to 286·9 million kWh, as compared with 273·7 million kWh in 1943 and 384·5 million kWh in 1938.

The Metropolitan Electric Supply Co., Ltd., reports that its gross revenue rose from £2,697,975 in 1943 to £3,032,538 last year. After meeting taxation and interest there is a net profit of £589,265 (against £439,594) to which are added a balance of £147,135 brought in and £6,956 transfers from London area reserves. The allocations include £49,009 (against £31,646) to reserve account and £175,000 (£100,000) to contingency account. The final dividend is 5 per cent. again making 8 per cent. and £177,066 is carried forward.

The North-Eastern Electric Supply Co., Ltd., has issued accounts showing available profit of £2,217,757 for 1944, as compared with £2,016,217 for the preceding year. Taxation takes £845,000 (£684,338), depreciation £775,000 (£675,000) and after providing for plant renewals and deferred repairs there is a net profit of £261,151 (against £262,481). The ordinary dividend, as already reported, is maintained at 7 per cent.

The London Passenger Transport Board reports a net revenue available for appropriation of £4,673,286 for 1944, £73,994 less than in 1943. As already announced the interest on the "C" stock is being reduced from 3½ to 3 per cent. The report states that the Board and the main-line railway companies recognise the need for proceeding with the outstanding works

under the New Works Programme 1935-40 as soon as circumstances permit after the war, and the need, in regard to town and country planning and industrial and housing schemes, for close consultation between the planning authorities and the transport undertakings. The Board's wartime work has included the production of Halifax bombers, the overhaul of tanks and other vehicles, adaptation of tanks for special purposes, and the manufacture of torpedo sight equipment for aircraft.

R. B. Pullin & Co., Ltd.—At the annual meeting on March 8th the chairman (Mr. R. B. Pullin) said that there was a promising future before the subsidiary companies. Although they were still practically wholly engaged in war work, consideration was being given to future development. He had recently visited the United States and had been able to make preliminary arrangements which should lead to profitable business after the war. In this country they had acquired the rights in several new instruments and had protected a number of inventions developed in their factories. The organisation and factory lay-out were being studied with a view to the future.

Associated Electrical Industries, Ltd., are maintaining their dividend at 10 per cent. After providing for depreciation and taxation, the net profit for 1944 was £467,543, as against £459,997 in 1943.

The Midland Manufacturing Co., Ltd., is to pay an ordinary dividend of 10 per cent. and a cash bonus of 15 per cent. (same). The net profit for 1944 was £48,423, compared with £46,394 in 1943.

The Manx Electric Railway Co., Ltd., reports a revenue of £22,193 for the year ended September 30th last, the net profit of £4,060 (£3,473) reducing the debit balance to £8,515.

Switchgear & Cowans, Ltd., are again to pay a dividend of 20 per cent. The profit for 1944 was £22,632, as compared with £22,653.

Worthington-Simpson, Ltd., are paying a dividend of 8 per cent., 1 per cent. more than last year. Profits increased from £21,106 to £23,092.

Heenan & Froude, Ltd., are again paying an interim dividend of 5 per cent.

New Companies

Scottish Switchgear and Equipment, Ltd.—Private company. Registered in Edinburgh March 7th. Capital, £10,000. Objects: To carry on the business of manufacturers, repairers, exporters and importers in electrical switchgear, switchboards and control gear, etc. Directors: H. A. McQueen, Greenbank Avenue, Whitecraigs, Renfrewshire; G. H. Bayliss, 40, Park Road, Walsall, Staffs; and R. Nicholls, 37, Hall Green Road, West Bromwich. Registered office: 700, Argyle Street, Glasgow.

C. A. Robinson, Ltd.—Private company. Registered March 5th. Capital, £500. Objects: To carry on the business of manufacturers of, and dealers in, electrical and radio equipment and accessories, etc. Directors: C. A. Robinson, Glen View, Watling Street, Nuneaton, and two others. Registered office: 116-118, Queen's Road, Nuneaton.

G. E. Samways & Co., Ltd.—Private company. Registered February 28th. Capital, £5,000. Objects: To carry on the business of manufacturers of and wholesale and retail dealers in and exporters and importers of wireless, television and telephonic apparatus, torches, accumulators, batteries, etc. Directors: G. E. Samways, 1, Larkhill Road, Cheadle Hulme, Ches., and two others. Secretary: Harry Cohen. Registered office: 181, London Road, Hazel Grove, Stockport.

London Provincial Electrical Distributors, Ltd.—Private company. Registered February 27th. Capital, £100. Objects: To carry on the business of manufacturers of, and dealers in, wireless, television, telegraphic and telephonic goods, etc. Directors: H. Mozer, 353a, Green Lanes, N.13; and E. F. Hiorns, 85, Wensleydale Avenue, Ilford. Registered office: 2-4, Paul Street, E.C.2.

International Electronic Corporation, Ltd.—Private company. Registered March 6th. Capital, £1,000. Objects: To carry on the business of manufacturers of, and dealers in, wireless sets, film and television apparatus, recording machine supplies, electronic, heating and refrigerating apparatus, etc. Subscribers: D. Sefton, 49, Clifford Avenue, East Sheen, S.W.14; and Miss Joan Scott-Smith, 59, Southampton Street, Reading. Secretary: Miss Joan Scott-Smith.

Megatron, Ltd.—Private company. Registered March 2nd. Capital, £2,000. Objects: To carry on the business of manufacturers of, and dealers in, selenium photo elements and rectifier plates, electrical, chemical, photographic, surgical and scientific apparatus, radio sets, etc. Directors: L. Bire, 365, Babbacombe Road, Torquay and F. Fyleman, 29, Hewitt Close, Hewitt Road, N.W.3. Registered office: 50, Pall Mall, S.W.1.

M. E. T. Radio, Ltd.—Private company. Registered February 21st. Capital, £100. Objects: To carry on the business of radio and television manufacturers, repairers and dealers, etc. Subscribers: G. M. Dowling, 12, The Drive, Esher; and A. Rosenberg, 21, Prout Grove, N.W.10. Registered office: 101, Leadenhall Street, E.C.3.

Central Electric (Orpington), Ltd.—Private company. Registered March 1st. Capital, £500. Objects: To acquire the business of radio and electrical engineers carried on by A. N. Fuller at 18, Central Parade, Orpington. The first directors are: A. E. Fuller and Kathleen Fuller, both of 143, The Avenue, W. Wickham, Kent. Registered office: 18, Central Parade, Orpington.

Bankruptcies

F. W. Wells, radio dealer, etc., carrying on business at 64, Town Street, Horsforth, and 37, Commercial Road, Kirkstall, both Leeds.—This application for discharge was heard recently at the County Court House, Albion Place, Leeds. The Official Receiver stated that the receiving order was made in March, 1935, and a first and final dividend of 8¼d. in the £ had been paid on claims totalling £1,567. The discharge was granted, subject to nine months' suspension.

T. P. Wood and T. George, trading as "T. P. Wood," electrical contractors, 28, Queen Street, Ipswich (separate application of T. P. Wood).—Application for discharge to be heard on April 18th at the Shire Hall, Ipswich.

STOCKS AND SHARES

TUESDAY EVENING.

STOCK Exchange markets find a fair amount of bread-and-butter business to keep them employed, and the curve of prices, in most departments round the House, continues to be upward. The security stocks steadily improve upon their previous prices, and the market for the best class ordinary shares is noticeably good. One of the minor features during the past week has been a considerable rise in the prices of Indian electric supply shares, following upon the recent proposals in connection with the Delhi Electric Supply Company. Prices of radio shares are inclined to be easier, owing to a dwindling of the interest recently displayed by speculative purchasers intent upon post-war prospects.

Transport Board and the War

London Passenger Transport "C" stock has been changing hands fairly freely on the previous basis of 66½, the price being unaffected by the issue of an unusually interesting report. This dealt with the Board's activities in connection with the production of "Halifax" four-engine bombers and other aircraft work which is, however, to come to an end this spring.

Government Control

The accounts of the Transport Board show an increase of £6½ million on the year, to £25 million, in the Trust Fund set up under the Railway Control Agreement pending the conclusion of control. The Parliamentary Secretary to the Minister of War Transport has repeated that the railways will remain under Government control for at least one year after the cessation of hostilities, and probably longer. Meanwhile, the Transport Board gives details in its annual report of the new works programme for 1935–1940. The work was partially completed before the outbreak of war caused its suspension.

International Combustion

International Combustion shares, now that the price, at 7½, is ex dividend, give a return of £4 6s. 8d. per cent. on the money. After paying an annual dividend and bonus making together 30 per cent. since 1940, the company recently raised the rate to 32½ per cent. for the year ended September, 1944, the additional 2½ per cent. being added to the bonus. It has been the company's practice to distribute its profits in this way, partly dividend, partly bonus, for some years past, and the 32½ per cent. just mentioned is a reversion to the results for 1938 and 1939. The annual meeting took place yesterday, Monday, when the chairman had a pleasant tale to unfold in way of progressive output. The plant, he said, is employed to its fullest capacity and is expected to be so for some years to come. The balance sheet, it may be added, is in a very healthy state, the company occupying a strong financial position.

Price Fluctuations

Amongst the principal price-changes since a week ago are the following :—

Share	New Price	Rise or Fall
Callender's	118s.	− 9d.
De la Rue	11	+ 10s.
Enfield Cable	65s. 9d.	+ 9d.
Falk, Stadelmann	36s. 3d.	+ 1s. 6d.
Hopkinsons	80s.	+3/16
Marconi Marine	35s. 6d.	+ 1s.
Metal Ind. "B"	49s. 6d.	− 1s.
Oriental Telephone ..	51s. 6d.	+ 1s. 6d.
Vactric	21s. 6d.	+ 4s.

The buying that caused the 10s. rise in De la Rue shares is based upon hope of an increase over the last dividend of 40 per cent., added to which there are the plastic possibilities which the company possesses. Vactric put on 4s. apparently, also, on dividend expectations. The smaller price fluctuations include rises of 6d., to 59s. 6d., in Telegraph Construction and Maintenance, in English Electrics to 56s., and of 3d. to 44s. 3d. in Ever Ready. Johnson & Phillips are 6d. lower at 78s. and Allen Wests 3d. down at 8s. 6d. Automatic Telephones retain their last week's gain of 1s. 6d. to 66s. 3d. In the preference list, Associated Electrical Industries "eights" are up 1s. at 41s. Consolidated Signals at 6¾ have recovered the dividend, 5s. 7d. per share, recently deducted from the price. H.T.A.—until lately Hall Telephone Accessories—remain dull. Lancashire Dynamo have again been wanted and the price is firm at 5¼. A rise of 1s. lifted Atlas Electric to 7s. 3d.

Supply Companies' Shares

The Home electricity supply companies' shares show a number of rises as compared with a week ago. For example, Bournemouths are 64s. 6d., Yorkshire Power 45s., Metropolitans and Midland Electric Power both 45s., North Eastern 36s., Northampton 51s., West Gloucester 25s. 6d., Southern Areas 23s. 6d. and Electric Finance 61s. 6d. In these the rises are 6d. or 1s. per share.

Indian Electricity Supply

The negotiations started for the acquisition of the Delhi Electric Supply Company by the Provincial Government have had a quickening effect upon prices of other shares in the same market. Calcutta Electrics have spurted to 51s. 6d., a rise of 3s. 6d.; Delhi ordinary, after being down to 65s., advanced to 75s. 6d. Madras Electric from 31s. 6d. have come up to 34s. 6d. Other members of the same group are the subject of inquiry, and with comparatively little floating supply in the market, quotations respond sharply to demand.

Calcutta Electric Trams are left in the background. The price has been steady about 65s. for a week or more, attention having been transferred from them to the shares of the supply companies.

Radio Shares

Prices of the shares in the popular radio group have waned to some extent. Cossor shares reacted from 33s. to 31s. 6d., and this had a slightly depressing effect upon Philco which, after touching 15s., went back to 14s. 6d. E.M.I. shares at 34s. 9d. are 9d. lower on the week. Other shares in the group hold their ground tolerably well, but business is by no means as active as it was a month ago, and speculative interest has drifted towards other directions.

Price-lists

The paper shortage emphasises ever more and more the difficulty of compressing a quart into a pint pot, and in view of the increasing problem that this presents, it has been decided to omit the weekly price-lists from the financial pages of the *Electrical Review* until such time as circumstances allow of their re-entry into the paper. It is proposed, in the meantime, to reproduce the prices at the end of each month.

NEW PATENTS

Electrical Specifications Recently Published

The numbers under which the specifications will be printed and abridged are given in parentheses. Copies of any specification (1*s. each*) *may be obtained from the Patent Office*, 25, *Southampton Buildings, London, W.C.*2.

H. ALLAWAY.—" Sealing the ends of electric cables." 7793. May 17th, 1943. (567618.)

Automatic Telephone & Electric Co., Ltd., and G. T. Baker.—" Telephone instruments." 11709. July 10th, 1943. (567600.)

Automatic Telephone & Electric Co., Ltd., and D. Wright.—" Electrical signalling systems." 13421. August 18th, 1943. (567590.)

British Thomson-Houston Co., Ltd.—" Apparatus for starting electric-discharge devices." 9756/43. June 20th, 1942. (567584.) " Apparatus for starting electric-discharge devices having thermionic cathodes." 5286/43. April 8th, 1942. (567613.) " Electric circuit interrupters and magnetic blow-outs therefor." 6972/43. May 6th, 1942. (567616.)

British Thomson-Houston Co., Ltd., and E. R. Edinborough.—" Bayonet type lampholders." 10534. June 29th, 1943. (567598.)

British Thomson-Houston Co., Ltd., and D. F. Welch.—" Electrical ignition systems." 16287. October 4th, 1943. (567565.)

British Thomson-Houston Co., Ltd. (General Electric Co.).—" Gas turbine arrangements." 9482. July 25th, 1941. (567546.)

H. O. Burge and Crompton Parkinson, Ltd.—" Transformers." 14639. September 7th, 1943. (567629.)

Carter Carburetor Corporation.—" Brushes for electric motors." 7400/43. April 4th, 1942. (567579.)

General Electric Co., Ltd., and R. W. G. Field.—" Electrical systems of remote indication." 13902. October 29th, 1941. (567638.)

General Electric Co., Ltd., and E. Friedlander.—" Electric metal vapour convertors having inter-phase transformers." 16168 December 15th, 1941. (567570.)

General Electric Co., Ltd., and F. C. F. Phillips.—" Electrical frequency meters." 16694. December 26th, 1941. (567571.) " Instruments for measuring the frequency of an electrical oscillation." 16742. December 29th, 1941. (567572.)

W. T. Henley's Telegraph Works Co., Ltd., and H. C. Hoban.—" Wipers or dies for use in the coating of wires." 12591. August 4th, 1943. (567587.)

H. E. Holman and E. C. Cork.—" Electrical apparatus for use with high-frequency oscillations." 17793. December 17th, 1940. (567637.) " Electrical apparatus for the measurement of electrical impedances at high frequencies." 749/42. December 17th, 1940. (Divided out of 567637.) (567639.)

Holophane, Ltd., and S. English.—" Reflectors for elongated light sources." 19365. November 19th, 1943. (567568.)

B. G. Horstmann.—" Electric servo mechanism of the follow-up type." 9364. June 10th, 1943. (567583.)

G. Keinath.—" Electric measuring systems." 8335/43. July 23rd, 1942. (567580.)

W. H. Lyons and H. Willet.—" Choke testing device for mercury vapour, fluorescent and like electric lamp installations." 18029. November 1st, 1943. (567605.)

Mullard Radio Valve Co., Ltd., and C. L. Richards.—" Electrical condensers." 10337. June 25th, 1943. (567597.)

Siemens Bros. & Co., Ltd., and D. A. Christian.—" Electrical testing arrangements." 921/45. August 13th, 1943. (Divided out of 567451.) (567674.)

Siemens Bros. & Co., Ltd., and D. P. Long.—" Counting of electrical impulses." 20733. December 10th, 1943. (Addition to 471987.) (567633.)

P. A. Sporing and Telegraph Condenser Co., Ltd.—" Electrical condensers." 12816. August 9th, 1943. (567588.)

P. A. Sporing, C. P. Johnson and Telegraph Condenser Co., Ltd.—" Electrolytic condensers." 12817. August 9th, 1943. (567602.)

Stackpole Carbon Co.—" Current interrupting devices for converting direct current into alternating current." 12511/43. May 8th, 1942. (567601.)

F. C. Stephan.—" Method of and means for fixing terminal insulators." 15118. September 15th, 1943. (567594.)

Westinghouse Electric International Co.—" Ignition systems for vapour-electric discharge devices." 11621/43. August 11th, 1942. (567599.)

Joint Electrical Showrooms

A Contractor's Views

By M. R. H. Sadler
(Mikijohns, Ltd., Ashbourne, Derbyshire)

Proposals to set up joint showrooms have been discussed by electrical contractors in a number of towns. The author considers that any advantages possessed by such establishments are outweighed by the drawbacks with which he deals in some detail

THERE has been a good deal of discussion, over a period of years, as to whether it would be desirable for electrical contractors, in any town, to club together and open a joint showroom. This experiment has, in fact, been tried in a Midland town and in this case the venture was a failure. The whole matter, in my view, ought to be approached from four different angles, namely, from the viewpoints of the contractors, the manufacturers, the supply undertakings and last, but by no means least, that of the general public.

From the contractors' angle, there are several main difficulties. Each contractor has different ideas and prefers certain designs of merchandise and particular manufacturers. The joint showroom would therefore have to hold a tremendously varied stock to cater for the whims of each individual contractor concerned. This would lead to the keeping of a colossal number of spares for the servicing of the appliances sold. The only way to get over this difficulty would be for the contractors merely to act as shareholders and to appoint a manager, who would decide the detailed policy and be responsible for what was ordered or stocked.

Electrical retailing is inseparable from a certain amount of electrical contracting. Many appliances require fixing, and others need new sockets to be wired for their connection to the supply. Many customers might not specify any particular contractor to do this work. Others may have already employed two or three of those interested in the showrooms. How is the manager to decide which contractor shall do the work in such cases? I think the manager might soon find things very difficult and might easily find himself losing popularity with, at any rate, some of his employers. Any sort of rota system would be difficult, taking all things into consideration. This problem might be met by having a small contracting staff attached to the showroom. Here again, however, certain contractors, who are very jealous of the quality of their installations, would resent interference by anyone except members of their own staffs.

It might perhaps be competent for a *few* of the smaller contractors in one section of a large town to form a separate company and appoint a manager to run an electrical shop; and I mean a shop as opposed to a showroom. This might run successfully, and the contractors' own staffs could undertake the contracting work by being loaned to the shop company on a proper commercial basis, as need arose. I am not, however, enthusiastic about this suggestion.

From the manufacturers' point of view, I am of opinion that they would definitely not favour all the contractors in a town joining together in one showroom. As I have already pointed out, the buying would have to be left to a manager, who, being human, would have his own pet whims and fancies. This would result in a few manufacturers being "well in," and the others left right out. The latter would then have to find other channels through which to distribute their goods, channels in which those concerned would probably have no electrical knowledge whatever. This would lead to dissatisfaction with the goods; they would often be improperly used and improperly installed, as each sale would lack the necessary technical advice.

Meanwhile, if each electrical contractor had his own shop, each bona fide manufacturer would have a reasonable chance of finding a suitable and adequate outlet for his goods, together with an assurance that the public would be able to use them to the best advantage, with the consequent enhancement of his good name.

In the case of the supply authorities, it must be admitted that the electrical contractor and retailer has always been the unpaid canvasser for more load. It is problematical whether one large showroom would work to this end half so effectively as a number of smaller shops distributed over the area. Also it is desirable for any supply authority to be able to pin down any particular installation to a particular contractor. Joint activities by the contractors would make this much more difficult.

The most important aspect of all, however, is: what system of distribution will serve the public best? It seems that a number of shops, well distributed throughout a town, will be vastly more convenient in most cases, and the type of personal attention, which the average customer values so much, will be more evident. There are a hundred-and-one small items so often required, such as plugs, adaptors, torch batteries, lamps and the like,

which it is so nice to be able to get "just round the corner." The central showroom cannot cater for this need adequately at all.

To sum up, therefore, it is my firm opinion that the joint showroom is not the answer to the problem of electrical retail distribution. I don't think, in most cases, it would be a successful commercial proposition for the contractors concerned, or that the manufacturers would welcome the adoption of this policy throughout the country. Further, I am very doubtful whether the joint showroom would assist the supply side so well as a number of smaller premises and I am sure that the public would not be so well served.

I am also convinced that the electrical shop, if properly run commercially and having the necessary technical knowledge behind it, should succeed, however modest its proportions. The secret of success is to aim at the creation of a retail shop as opposed to a showroom, although the latter may well be incorporated in the larger establishment, provided the shop exists in the forefront, and that there is a good variety of the small stuff, or what might be termed the "bread and butter lines." The adequate stocking of such goods, which can be done on a modest capital outlay, causes members of the public to use the shop, and having received, at little inconvenience to themselves, what they require in a small way, they see the larger goods and appliances displayed, and the sale of these will naturally follow.

To secure a really good public service, through the electrical retailer, I think one point is absolutely essential: each retailer must be a member of his trade organisation. He will then meet his co-traders at regular intervals and a spirit of co-operation and mutual help will grow up, so that each man who specialises in a particular line will be able to assist his fellow members in that direction, to the benefit of the customer.

Argentine Foreign Trade

Sharp Decline in First Half of 1944

IN the electrical import trade of Argentina during the first six months of last year there was a decline of nearly 50 per cent. compared with the first half of 1943. It occurred largely in the radio and telephone group, while in some items of electrical apparatus no imports at all were recorded, *e.g.*, accumulators for cars, vacuum cleaners (142,000 pesos in the first half of 1943) and electric furnaces (327,000 pesos). Similarly in the cable group there were no imports of covered cable and wire over 5 mm. or silk-covered wire. On the other hand there were increased imports of dynamos and motors over ¼ HP.

Exports from Argentina of electrical goods declined on balance by reason of a big drop in the radio group although there were increases in those of accumulators, batteries and parts, and unspecified electrical goods. The values of the principal items of import and export, with notes of increases or decreases compared with the first half of 1943 are appended. They are invoice values. The exchange rate for the peso may be taken as 17 to the £.

Class of Goods	Jan.-June 1944 Pesos (000)	Inc. or dec.
IMPORTS		
Dynamos and motors over ¼ HP	720	+ 155
Ditto up to ¼ HP	8	+ 2
Fan motors	3	+ 3
Cable and wire up to 5 mm. covered with cotton, rubber, etc.	102	+ 35
Cable and wire up to 5 mm. lead-covered	43	— 17
Cable and wire, enamelled	39	+ 26
Other electric wires and cables	23	— 87
Flex, covered with cotton, wool, etc.	130	+ 104
Flex, silk-covered	2	+ 1
Telephone cables, underground, lead-covered and steel or iron armoured	6	— 41
Telephone cables, iron or steel, covered with cotton, gutta-percha, etc.	460	+ 258
Parts for accumulators and batteries	84	— 112
Batteries	21	+ 13
Ammeters and voltmeters	46	+ 14
Radio-telephone apparatus	15	— 64
Receiving sets	60	— 218
Loudspeakers, metal	2	— 9
Radio-telephone parts	110	— 208
Telephones	103	— 250
Telephone material	157	— 112
Cookers, toasters, heaters, etc.	4	+ 3
Switches, circuit-breakers, cut-outs, fuses, etc.	114	+ 66
Vacuum cleaners	—	—
Electric bells	—	—
Insulating tape	2	— 1
Change-over switches	140	— 917
Incandescent lamps	564	— 90
House-service meters	686	+ 1,401
Insulating tubes	10	+ 4
Other electrical materials	1,013	— 129
EXPORTS		
Accumulators, batteries and parts	243	+ 62
Telephone apparatus and accessories	60	— 22
Radio apparatus and accessories	135	— 537
Lamps	50	+ 6
Other electrical material	845	+ 266

Mill Installations.—Greater use of electricity in the town's mills next winter is forecast by the Nelson Weavers' Association. Firms are moving in the direction of better lighting, and this summer will probably see the installation of electric lighting in several mills.

CONTRACT INFORMATION

Accepted Tenders and Prospective Electrical Work

Contracts Open

Where "Contracts Open" are advertised in our "Official Notices" section the date of the issue is given in parentheses.

Abertillery.—March 17th. Electricity Department. Various materials. (March 9th.)

Australia. — May 28th. Mackay City Council, N.S.W. 2,500-kW turbo-alternator. Contract 42/45. Plans and spec. (10s. 6d.) from A. E. Axon, consulting engineer, Bank of Australasia Chambers, Brisbane.

July 4th. Victoria State Electricity Commission. 40,000-kVA synchronous condenser, Spec. 44-46/1.

July 11th. New South Wales Railways. Traction motors, control equipment, air compressors and pantographs for one electric locomotive.

Halifax.—March 30th. Markets Department. Renewing electrical installation at the abattoir. (March 9th.)

Manchester.—April 3rd. Electricity Department. Automatic voltage variation equipment and reactors. Mercury arc rectifier equipment. DC traction switchgear. (March 9th.)

April 7th. Electricity Committee. Service cut-outs and cables. (See this issue.)

Middlesbrough.—April 20th. Tees-Side Railless Traction Board. Two 300-kW mercury arc rectifiers and associated equipment. (March 9th.)

Southend-on-Sea.—March 31st. Electricity Department. House meters. (March 2nd.)

Wolverhampton.—April 4th. West Midlands Joint Electricity Authority. Transformers. (March 9th.)

Orders Placed

Barrow-in-Furness.—Electricity Committee. Accepted. 4,000-kVA transformer (£4,073) and materials for re-arrangement and alterations to 11-kV metalclad switch units at the Buccleuch Street generating station and the Dalton and Ulverston substations (£629).—Metropolitan-Vickers.

Bolton.—Electricity Committee. Accepted. 31,250-kW turbo-alternator and ancillary plant. —English Electric Co.

Hastings.—Electricity Committee. Accepted. New blading for turbo-alternator (£2,655).—Brush Electrical Engineering Co.

Mansfield.—Electricity Committee. Accepted. Switchboard (£629).—Crompton Parkinson.

Sheffield.—Welfare Committee. Accepted. Electric bread-cutting and buttering machine (£175).—Avamore Engineering Co. Electric floor scrubbing machine (£199).—R. G. Dixon & Co.

Swindon.—Electricity Committee. Accepted. Cable for twelve months.—Standard Telephones & Cables.

Tynemouth.—Corporation. Accepted. Mobile X-ray plant (£700).—Watson & Sons (Electro-Medical).

Contracts in Prospect

Particulars of new works and building schemes for the use of electrical installation contractors and traders. Publication in this section is no guarantee that electrical work is definitely included. Alleged inaccuracies should be reported to the Editors.

Bolton.—Works additions; Hy. Crossley (Packings), Ltd.

Bristol.—Children's home at Nore House, Portishead (£6,250); borough engineer, 7, College Fields, Clifton.

Caernarvonshire.—New County Hospital at Penrhos; W. Ll. Jones, county architect, County Offices, Caernarvon.

Carlisle.—Extensions to Cumberland Infirmary; S. W. B. Jack, architect, 35, Warwick Road.

Chester.—Works laboratory; Williams, Ltd.

Derbyshire.—Temporary school, including kitchen and dining room, Allestree (£9,000); J. Harrison, county architect, St. Mary's Gate, Derby.

Devon.—Horticultural training and experimental station; county architect, Heavitree Road, Exeter.

Dunfermline.—Proposed police headquarters at Abbey Park Place; Town Clerk's Office, City chambers.

Essex.—School huts, Danbury (£2,300) and canteen and youth centre, Felstead (£2,900); county architect, Chelmsford.

Haverfordwest.—Additions and alterations, operating theatre block, Pembroke County War Memorial Hospital; O. T. Thomas, architect, Boyne House, Haverfordwest.

Herefordshire.—Additional county offices; county architect, Hereford.

Isle of Wight.—Remodelling Senior School, Ventnor (£3,490); county architect, Newport, Isle of Wight.

Mansfield.—Extension, upholstery works, Nottingham Road; Field Mill Upholstery, Ltd.

Manchester.—Completion of extensions to the College of Technology, Whitworth Street; Bradshaw, Gass & Hope, architects, 19, Silverwell Street, Bolton.

Montgomeryshire.—Scheme for eight new schools and enlargement of existing schools (£566,974); county architect, County Offices, Welshpool.

Newcastle-on-Tyne.—Conversion of premises in Shields Road into flats (£1,300); H. Kindred, builder, West Road, Newcastle.

Northants.—School extensions, Kettering (£7,000) and school canteens, Brackley, Kettering and Wellingborough (£9,400); county architect, Northants.

Oldham.—Senior school, Alma Mill site, Scottfield; borough engineer, 75, Union Street.

Orpington.—Pump house and other works (£2,079) for the Metropolitan Water Board; Grace & Marsh, Ltd., contractors, New Bridge Works, Waddon, Croydon.